March 22, 1943

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

PUBLIC LIBRARY
MAR 22 1943

CMP
HAS A DOUBLE MEANING

You know these letters as the abbreviation for the Controlled Materials Plan. But to many industries CMP has long been the identification for Precision Cold Rolled Strip Steel. Today, vital war product manufacturers know CMP means trouble-free, top-speed production. By accurate control in rolling practice, CMP assures the closest tolerances and uniformity of desired physicals that eliminate fabrication problems and provide more finished parts per pound. In many cases this makes possible successful replacement of critical light gauge, non-ferrous metals and usually lowers costs . . . Worth an investigation for your after-Victory products?

STRIP STEEL

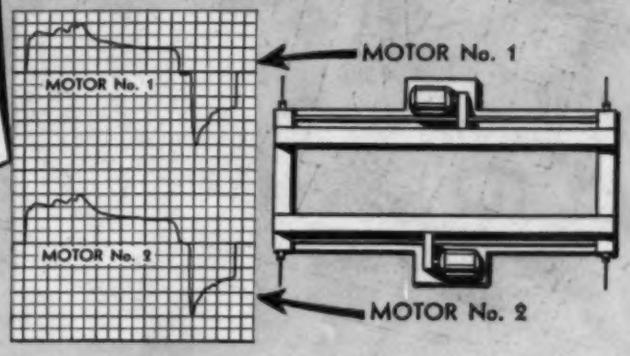
The
COLD METAL
PRODUCTS CO.
SUBSIDIARY OF THE COLD METAL PROCESS CO.
YOUNGSTOWN, OHIO

GIVES MAXIMUM PRODUCTION PER TON

2 MOTORS operate as one

with this EC&M DUPLEX Controller and SINGLE MASTER

96-ft. Span O.H. Stockyard Cranes



Graphic ammeter curves taken simultaneously of the 2-40 h.p. series motors on the bridge motion of these cranes are practically identical, showing that each motor takes its share of the load under any operating condition.

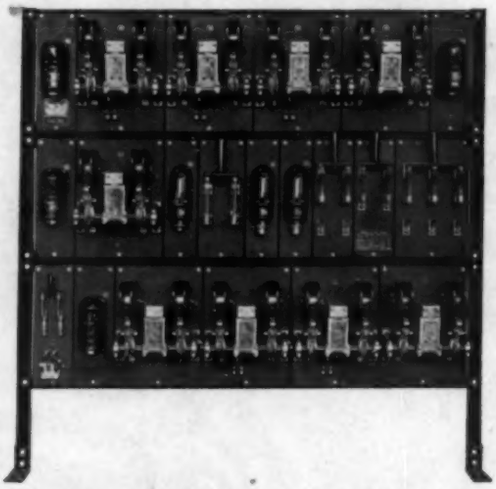
ON many crane and mill drives, it is common practice to employ two or more motors of the same horsepower rating which are mechanically connected through the gearing to drive the same load.

Although this dual method of motor drive offers many advantages, the control must be designed correctly to insure that the motors divide the load equally or severe strains on machinery or damage to the motors will occur.

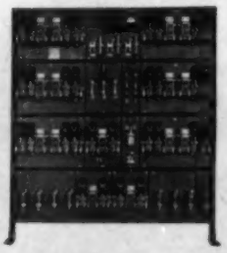
EC&M *Duplex* Magnetic Control (with double-pole contactors) not only provides an independent circuit for each motor, but also insures equal division of the load by maintaining uniform values of current in each motor circuit under *any* condition—starting—accelerating—stopping or reversing.

Likewise, when bringing the master switch to the "off" position or when an overload relay trips, the brakes on each motor (as used on duplex hoists, etc.) are applied simultaneously, thus eliminating severe strains on the gearing, shafts, and bearing bolts that mechanically connect the motors.

For applications where four motors are operated in parallel and connected through the gearing to drive the same load, the EC&M *Quadruplex* Magnetic Controller (with 4-pole contactors) is available. Complete details on request.



EC&M Duplex Controller for D-c Motors, Bulletin 921 for cranes—Bulletin 925 for mill auxiliaries.



Also built for A-c wound-rotor motor drives in both duplex and quadruplex style—Bulletin 930.

THE ELECTRIC CONTROLLER & MFG. CO.

CLEVELAND OHIO

SAFE WAYS IN WAR PRODUCTION

NEW WORKER—Every new employee in a Bethlehem Plant wears this button. It helps to fix his attention on safety. It signals to more experienced employees that he is new to the plant, and they keep an eye on him, and do not hesitate to offer friendly guidance in case he forgets instructions and unknowingly breaks any safety regulation.

Industrial accidents, bad enough because of the human distress they cause, are also a grievous drag on production. Every day that injury lays up a worker means lowered output of the materials our armed forces are asking for.

Safety engineers know they must be more than ever on guard as pressure for production intensifies and men work against time. When war came, Bethlehem Steel Company expanded its accident-prevention program to meet the new conditions. Special efforts were addressed to the new employee to make him safety-conscious from the moment he walked into the plant. And by posters, group meetings and individual instruction, the safe way of doing his job was ground into the subconscious of new Bethlehem employee and veteran alike.

Significant are the results of a current study, showing that of all disabling accidents to Bethlehem employees less than one-third occur in the course of their work. Even with employment rolls upped by the tens of thousands and plant operations at top speed to meet the demands of the war program, the Bethlehem employee is safest, best protected against injury, during the hours he spends on the job.

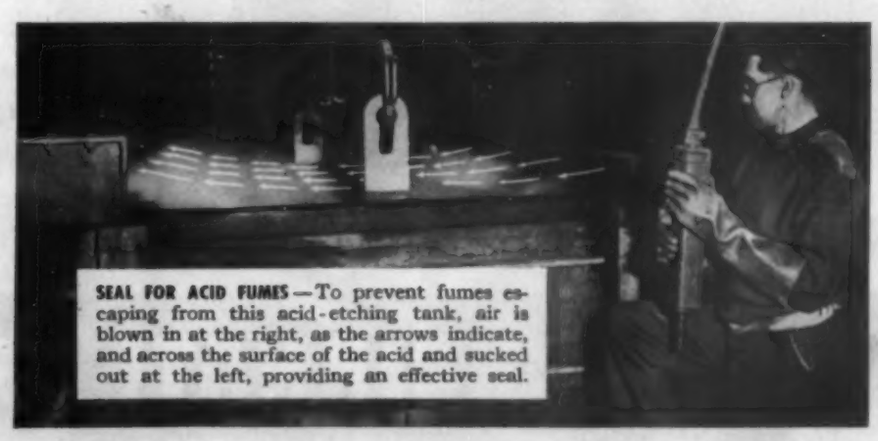
AUTOMATIC HAND GUARD—This man is operating a trimming press. If he should absent-mindedly let his hands move too near the danger zone, the two cables will automatically whisk them back to safety, before the ram of the press descends.

100% HEAT-INSULATED—Asbestos-covered hood, chrome-leather full-length apron, chrome-leather gloves, chrome-leather full-length sleeves and asbestos guard on torch handle give this worker complete protection against heat and flying sparks.

EYES DOUBLY GUARDED—Even though this grinder is equipped with a heavy glass shield, the eyes of the man who is operating it are given further protection against sparks or flying bits of abrasive by the cup goggles that he is wearing.

BETHLEHEM STEEL

Bethlehem Steel Company is actively supporting the National Safety Council in its campaign against accidents in war production, through the War Production Fund to Conserve Manpower.



SEAL FOR ACID FUMES—To prevent fumes escaping from this acid-etching tank, air is blown in at the right, as the arrows indicate, and across the surface of the acid and sucked out at the left, providing an effective seal.

OFFICIAL PHOTO, U. S. ARMY AIR CORPS

A complete picture of the many uses of Cincinnati Press Brakes is covered in Catalog B-1. Write for your copy.

Runways for the "War Birds" are laid like a carpet—landing fields are built like magic—Cincinnati Press Brakes are at work on both planes and landing mats.

Their adaptabitity and accuracy may solve a production problem for you.

THE CINCINNATI SHAPER CO.

CINCINNATI OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

TIER-LIFT ELECTRIC PLATFORM TRUCK

20-TON CAR HANDLING FOUNDRY MOLDS

SPECIAL LARGE CAPACITY CORE-OVEN CAR

2-TON RUBBER-TIRED PLATFORM TRAILER

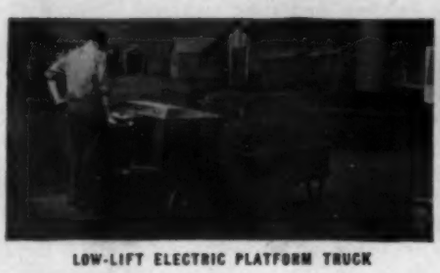
A VETERAN TIER-LIFT ELECTRIC TRUCK

RUBBER-TIRED STOCKROOM TRAILER

PLATFORM TRAILER WITH STEEL WHEELS

PLATFORM CAR HANDLING STEEL PLATE

TWO 40-TON DOUBLE-TRUCK PLATFORM CARS



LOW-LIFT ELECTRIC PLATFORM TRUCK

5-TON PLATFORM CAR, TIMKEN BEARINGS

OPEN FRAME TRAILER, 5000 LBS. CAPACITY

ANYTHING ON WHEELS

All of these cars, trucks and trailers are serving *one* manufacturer – an Army-Navy 'E' plant. *All of them were engineered and built by* EASTON. Still, they show but a few of the hundreds of different types of EASTON handling equipment which are moving the materials for War Production. Here is a wealth of 'know-how' that makes EASTON your material handling headquarters. For information on modern, efficient handling methods for all types of raw materials, parts, finished products or waste, write to: Engineering Counsel, Easton Car & Construction Company, Easton, Pennsylvania.

A-1002

EASTON

INDUSTRIAL CARS
TRUCK BODIES · TRAILERS
ELECTRIC LIFT TRUCKS

BEHIND THE SCENES

RQD—A New Plan To End Plans

■ After struggling with CMP, PRP, ACS and the several dozen other flavors of alphabetical soup dished up during the past couple of years, manufacturers should find considerable relief in the new plan (to end all plans) known as RQD. RQD was conceived in a few idle moments by H. van Zandt, who is now officially with the Iron & Steel Branch of WPB, but who will undoubtedly be drafted to take complete charge of his brain-child when it becomes effective. STEEL feels greatly honored to be able to scoop the country with the following details of RQD:

A complete new system of industrial procedure in Washington to become effective April 1st, 1943, was announced today.

It will be known as the RQD or Request, Quandary, and Deferment Plan. The Plan is simplicity itself, centering around 173 Requirement Agencies, with more to come. Each Requirement Agency is subdivided into Bureaus, Divisions, Branches, Sections, Units and People. The last item is an innovation, being tried for the first time in this country. Authorities differ, of course, as to if and how this feature will work.

The RQD organization has been assigned quarters in the Pentagon Building, which unfortunately has space enough to house only some of the more important Agencies. Army has been moved out of Pentagon and is housed in tents down by the Potomac River. It is now known as the Second Army of the Potomac.

A brief description of RQD is as follows: If you want to procure materials, you make a request on Form IQ-798. One copy goes to the producer of such materials, one copy to the proper Requirement Agency, if known. (If not known, ask either the U. S. Bureau of Information or the night doorman at the Carleton Hotel.) One copy goes to the Washington Zoo, and one copy to Mrs. Roosevelt's sick Aunt in Peekskill, New York.

The producer now reprints 10,000 copies for distribution among a selected list of official authorities in Washington. To get on that list you must:

1. *Send $100.00 to Who's Who.*
2. *Spend at least six months in a recognized institution for the feeble minded.*
3. *Possess a Short Snorter card.*

The producer now takes a copy of the form, puts it in his pocket and starts for Washington. When he gets to Pentagon—but let me tell you. Last Tuesday a prominent manufacturer from the middle west entered Pentagon at 10:00 o'clock in the morning. He started wandering around, and when he came out, by God it was Saturday afternoon and he was in Philadelphia! Somehow or other the St. Bernard dogs that are maintained in Pentagon to track down and succor luckless visitors who get lost had missed this particular man, and it was only by the grace of God and his own splendid sense of direction that he hadn't been diverted through Corridor 976 onto the Pennsylvania turnpike.

Having made clear exactly how Requests are handled, we come to the second, or Quandary phase of RQD. This is known as the basic, or preliminary decision stage, and applies only to manufacturers of Class A Products. Class A products are not Class B Products unless the Class B Products are also consumed by the manufacturer who manufactures Class A Products, in which case Class B Products are considered to be Class A Products and are treated accordingly. It's as simple as that.

Now having disposed of Quandary, we come to Deferment, which is really the essence of the whole RQD plan. To begin with, each manufacturer has to fill out a questionnaire, which is supposed to engage his entire attention through the ensuing quarter or until the next plan is ready to be issued.

A digest of the questionnaire is as follows: If during the previous quarter you used or had in inventory, any of the commodities listed in Section 1, Item 10, Article 117, state the amount so involved and remember that Section 35-A of the Criminal Code makes it a Criminal offense to make any statement without certifying to the best of your knowledge and belief that the information contained therein is correct and complete so help you God and the Seventy-Third Congress. Now state the quantity put into production, receipts and shipments during the previous quarter, deduct the amount of your inventory, invert the divisor and proceed as in multiplication.

Also state your relationship to the deceased, name the Vice President of the United States during the first Coolidge administration, who killed cock robin, and where were you on the night of June the third? Answer yes or no.

The simplicity of this Plan has appealed to all who have reviewed it, and it is believed that this new system will eliminate most of the complications that have been so much criticized in plans heretofore employed.

Ordnance Inspection

■ Editors of STEEL who attended a demonstration at Aberdeen Proving Ground in Maryland a few days ago are in full agreement with Army men who contend that the U. S. now has the best and most complete range of guns and equipment of any armed force in the world.

Our boys stuffed their ears with cotton and took it all in, even to the point of volunteering to fire some of the small arms at what apparently proved to be a rather elusive target.

The German 88 mm. gun was on display for comparison purposes and despite the big play it got in one phase of the African campaign it would appear to be already outmoded by our new 90 mm's, which look awful tough. It was explained that the reason the Heinies were so successful with their 88's was only for the reason they were planted in a pit between two tanks which served as decoys. That gag worked once, but no more.

One of the most intriguing things demonstrated was the "Bazooka", about which word is beginning to come back from the Tunisian front. It's a "dainty" little device whose sole purpose in life is to trip through a nice big German tank, including the new Mark VI's, setting them on fire and killing all the occupants.

Sorry we can't tell you more about the stuff but you can depend upon it that it's good and industry can take a bow for producing it.

Following Mr. Greeley's Advice

■ Steel Plant Editor, John Knox, is off for an extended trip to the west coast to study and report on the new steelmaking capacity there and to give you a complete story on the economics and future development of the west coast steel industry.

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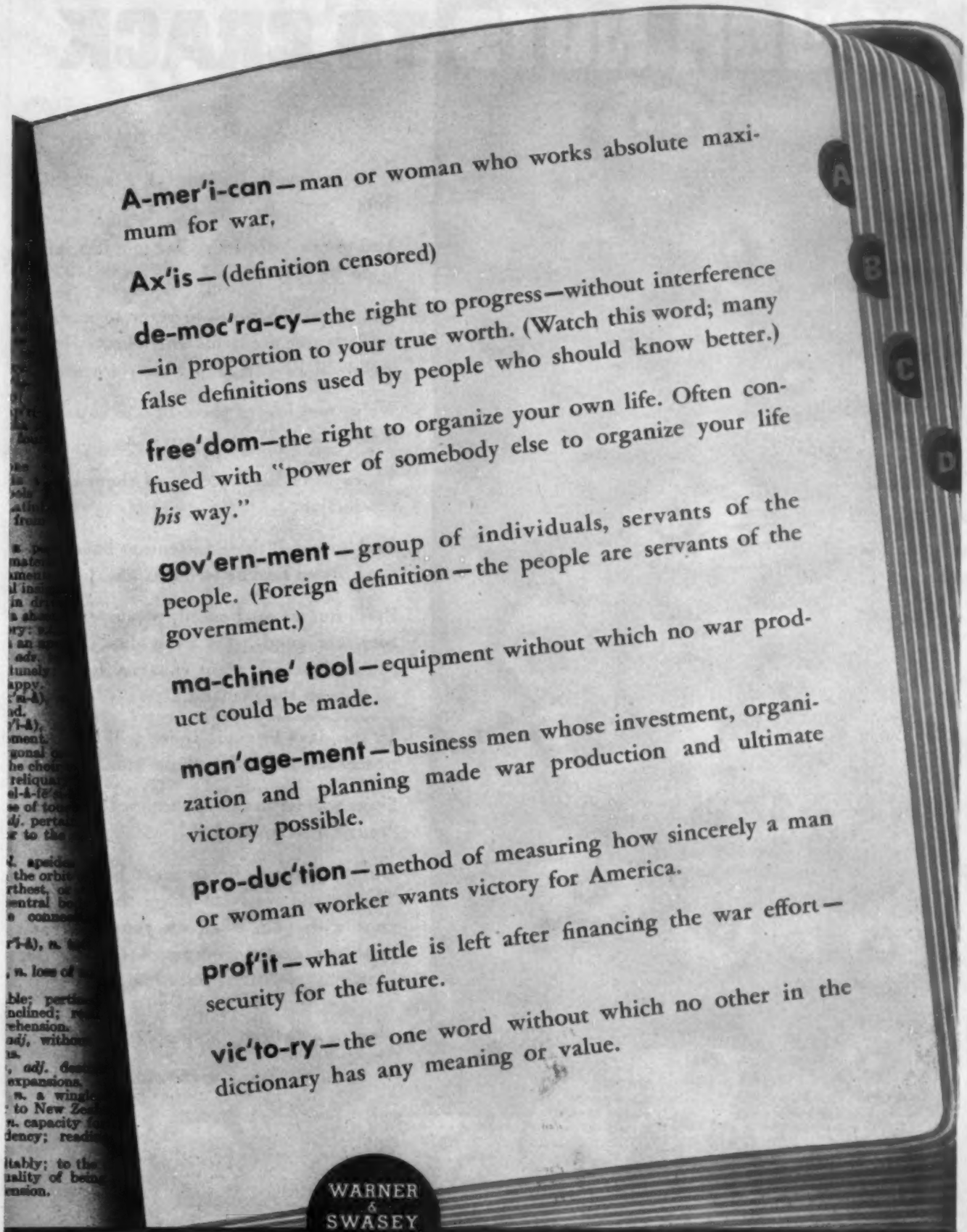
THE NEW INDUSTRIAL DICTIONARY

Eighth revised (war) edition



A-mer'i-can—man or woman who works absolute maximum for war.

Ax'is—(definition censored)

de-moc'ra-cy—the right to progress—without interference—in proportion to your true worth. (Watch this word; many false definitions used by people who should know better.)

free'dom—the right to organize your own life. Often confused with "power of somebody else to organize your life *his* way."

gov'ern-ment—group of individuals, servants of the people. (Foreign definition—the people are servants of the government.)

ma-chine' tool—equipment without which no war product could be made.

man'age-ment—business men whose investment, organization and planning made war production and ultimate victory possible.

pro-duc'tion—method of measuring how sincerely a man or woman worker wants victory for America.

prof'it—what little is left after financing the war effort—security for the future.

vic'to-ry—the one word without which no other in the dictionary has any meaning or value.

WARNER & SWASEY
Turret Lathes
Cleveland

YOU CAN TURN IT BETTER, FASTER, FOR LESS
...WITH A WARNER & SWASEY

TOUGH NUTS TO CRACK

LOCKED in place on bolt by grip of tough locking collar
SEALED at top to protect working threads from corrosion
HOLDS nut thread against bolt thread — prevents axial play
FITS any standard bolt. Made in all sizes and types

● We've made billions of Elastic Stop Nuts.

And to our knowledge not one has failed to do its job.

But the tough nuts we refer to now are the fastening problems which looked hopeless until Elastic Stop Nuts were used.

We've met lots of these in our day — and licked them.

There have been plenty of them in war production.

And how well these fastenings have filled the bill can best be told this way:

Every nut we can possibly produce is going into war goods. Yet even doubling our round-the-clock plant capacity hasn't let us gain on the demand.

In the days to come there will be many peacetime needs for these nuts.

Some will be simple. Others will look like "tough nuts to crack."

Our engineers like to meet both kinds. They stand ready to share their experience with you, work on your fastening problem and recommend the proper Elastic Stop Nut application for the job.

ELASTIC STOP NUTS

Lock fast to make things last

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA
UNION, NEW JERSEY

Let THE INDUSTRY SPEAK OF OUR DESIGN

REYNOLDS METALS COMPANY
INCORPORATED
FEDERAL RESERVE BANK BUILDING
RICHMOND-VIRGINIA

2500 SOUTH THIRD ST.
LOUISVILLE, KY.

December 17, 1941

Hydropress, Incorporated
277 Madison Avenue
New York, New York

Gentlemen:

I believe you would like to have an expression from us on the 2200 ton horizontal extrusion press which you have supplied for our new plant at Louisville and which, although in operation but a short time, has established itself as being very flexible and efficient.

We have produced tubing as well as solid shapes and bar and have pierced solid billets of hard alloys from which we obtained concentric tubes of the best quality which can be desired.

Our opinion is to the effect that the press is excellently engineered, both from the standpoint of design and workmanship, and in our opinion is the most efficient now available on the market.

Sincerely yours,

I. P. Macauley
Vice President
REYNOLDS METALS COMPANY

IPM:r

THIS LETTER NEEDS NO COMMENT

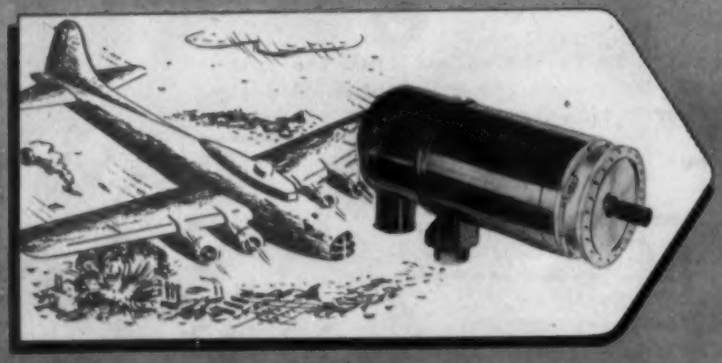
HYDROPRESS · INC.
ENGINEERS CONTRACTORS
HYDRAULIC PRESSES · ROLLING MILLS
PUMPS · ACCUMULATORS
570 LEXINGTON AVENUE · NEW YORK · N. Y.

Do You Need

MOTORS FOR NAVAL APPLICATION

In a space of *five weeks*, production of a brand new series of motors was raised 400 motors per week. Scheduled delivery to eight different customers was smoothly established.

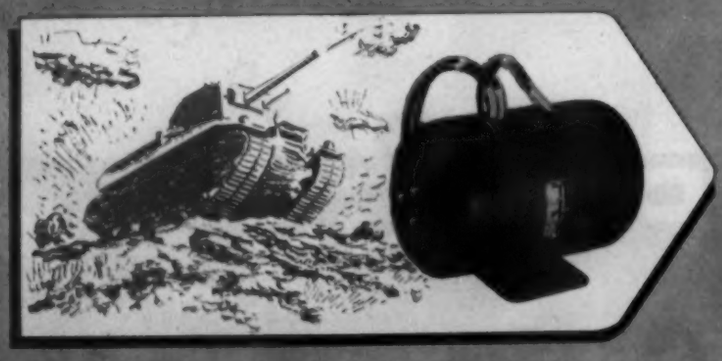
★



A SMALLER, LIGHTER GENERATOR FOR AIRCRAFT

A generator *one-sixth the weight* of comparable industrial types was developed, meeting stringent specifications for high-altitude performance —a typical example of ingenious G-E design.

★



A SPECIAL DYNAMOTOR FOR USE ON TANKS

To power radio equipment in tanks, a special dynamotor with increased capacity was developed. Sample in eight weeks; production in large quantities eight weeks after approval.

Builder of TRI CLAD Motors ★ AMPLIDYNES AIRCRAFT POWER PACKAGES DYNAMOTORS GENERATORS EVERYTHING IN MOTORS

FIGHTING MOTORS*?

WE MAY BE ABLE TO HELP YOU

WE invite builders of motor-operated combat equipment to get in touch with us in the earliest stages of planning for their motor requirements. We are building so many new and ingenious fighting motors, it's 10 to 1 that we already have something which can be adapted to meet your needs.

Although we cannot accept any new orders for certain types of fighting motors, we do have, or will have in the very near future, facilities to engineer and build additional fighting motors of other types. We would appreciate the opportunity of reviewing your needs during the earliest stages of your planning, in order to determine how we can help you.

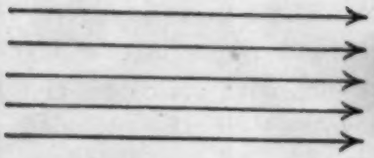
We have the pledge of the more than 1700 design and application engineers in our motor plants to give the fastest service it is humanly possible to give whenever they are asked to help on fighting motors. And even if we must say "No," we believe you will appreciate a fast answer. Get in touch with your local G-E representative to see if the fighting-motor design you need can be adapted to our available production facilities. *General Electric Co., Schenectady, N. Y.*

* **"FIGHTING MOTORS"** is our term for electric motors in equipment used by our fighting forces — motors which contribute to combat efficiency. In contrast to motors used for production, they may be designed, and produced by the thousands, and declared obsolete — all within a few months.

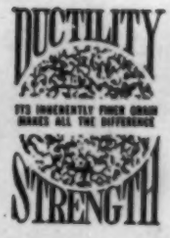
Fighting motors often require amazing ingenuity in their design, always demand the utmost in reliability, and must be produced with a new concept of speed. They are truly *life or death motors.*

GENERAL ELECTRIC

The alloy steel
with unusually high
resistance
to
Shock
and
Impact



N-A-X
High Tensile



Resistance to impact and fatigue—those are the properties of N-A-X HIGH TENSILE that keep mobile equipment on the job in all kinds of weather—rain or shine—sleet or snow—in blazing hot or sub-zero temperatures, year in and year out.

Builders of mobile equipment like N-A-X HIGH TENSILE for usually there are no shop "change-overs" required for its fabrication. It can be cold formed easily and welded by any of the standard practices used for mild carbon steel.

There are other valuable properties of N-A-X HIGH TENSILE, too, that aid materially in extending the service of mobile equipment. They are: unusual ductility, high yield point and ultimate strength, excellent resistance to corrosion and abrasion, extremely high resistance to fatigue and impact, at normal as well as at sub-zero temperatures.

Would you like to know more about N-A-X HIGH TENSILE? A Great Lakes engineer, who has wide experience in the use of this remarkable low alloy steel in hundreds of applications, is available at any time to talk over your requirements or give you advice on its use. Write, telephone or wire for one today.

GREAT LAKES STEEL CORPORATION, DETROIT, MICH. *Sales Offices in Principal Cities*

Division of NATIONAL STEEL CORPORATION Executive Offices, Pittsburgh, Pa.

Meehanite Foundries

Allentown, Pa.
Traylor Engineering Company
Ansonia, Conn.
Farrel-Birmingham Co., Inc.
Bridgewater, Mass.
The Henry Perkins Co.
Brooklyn, New York
E. W. Bliss Company
Buffalo, N. Y.
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Otis-Fensom Elevator Company
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New York, N. Y.
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E. Long, Ltd.
Philadelphia, Pa.
H. W. Butterworth & Sons Co.
Florence Pipe Foundry & Machine Co.,
(R. D. Wood Company, Selling Agents)
Phillipsburg, N. J.
Warren Foundry & Pipe Corp.
Pittsburgh, Pa.
Rosedale Foundry & Machine Co.
Rochester, N. Y.
American Laundry Machinery Co.
St. Louis, Mo.
Banner Iron Works
St. Paul, Minn.
Valley Iron Works
London, Eng.
The International Meehanite Metal Co., Ltd.
Waterloo, N. S. W.
Australian Meehanite Metal Co., Ltd.
Johannesburg, South Africa
Meehanite Metal Co. (S.A.) (Pty.) Ltd.

TYPES GM, GA and GB

Meehanite

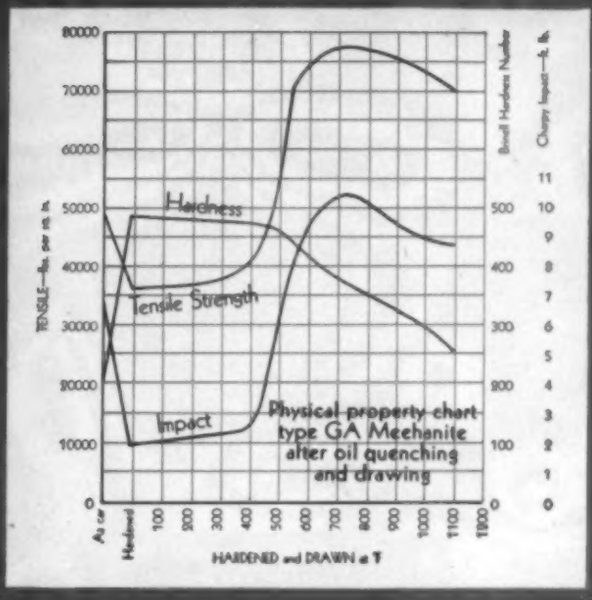
CAN BE HEAT-TREATED

FOR

Greater Hardness

Strength

Toughness


Hardness
Tensile Strength
Impact
Physical property chart type GA Meehanite after oil quenching and drawing
HARDENED and DRAWN at °F

As shown by the above curves certain Meehanite castings are susceptible to heat treatment much in the same manner as carbon tool steel. By heating above the critical change point and quenching they will be hardened. If cooled slowly in the furnace they will be softened. To improve strength and toughness a quenching followed by a drawing treatment is recommended. Tensile strengths above 70,000 pound p. s. i. and Brinell hardness up to 500 may be obtained. Impact strength, transverse strength, and deflection are also improved.

Meehanite castings do not usually require annealing to soften for machinability, or for stress relief. However, when such treatment is desired Meehanite castings will respond to low temperature or high temperature annealing.

Meehanite Foundries have full information on heat treatments and will be glad to discuss the subject with you.

MEEHANITE RESEARCH INSTITUTE · 311 Ross St., Pittsburgh, Pa.

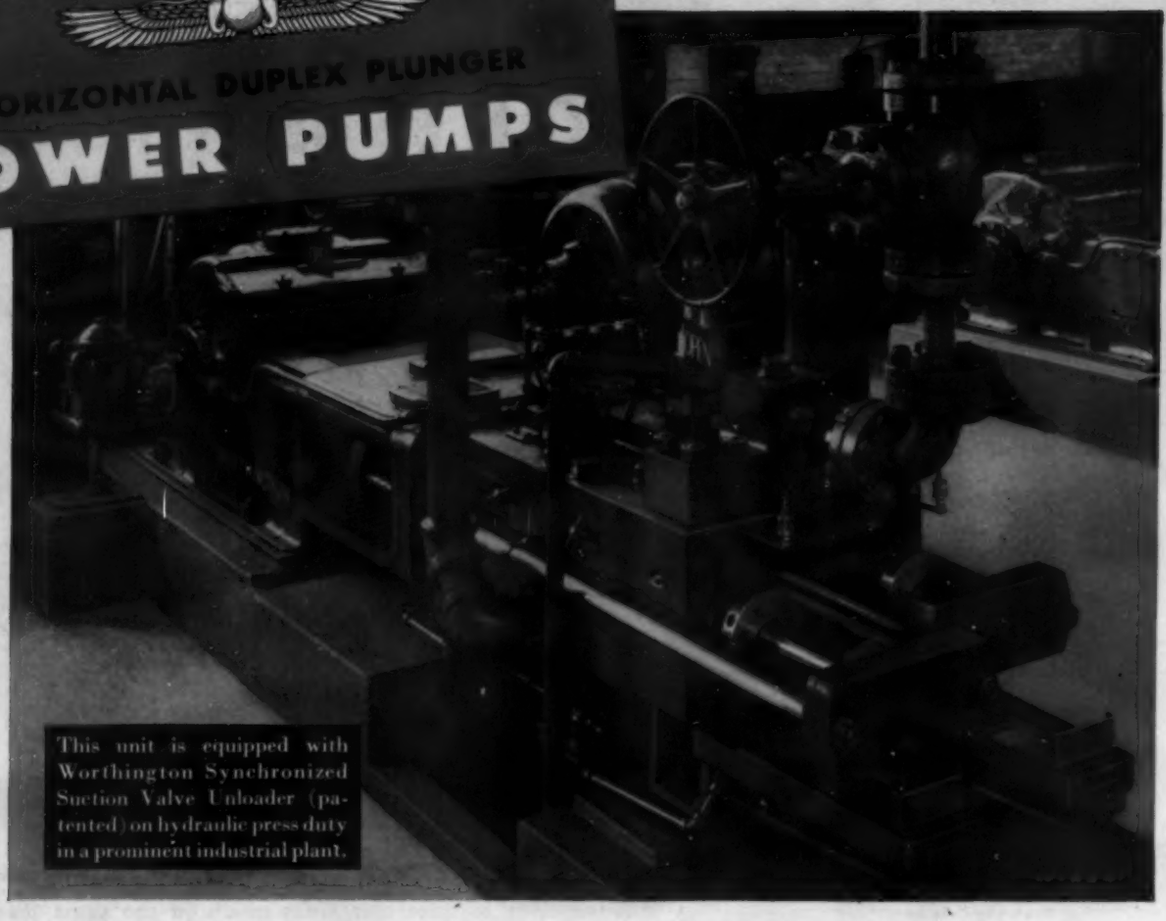
MEEHANITE

SEND FOR BOOKLET

Making the Most of Meehanite

WORTHINGTON

HORIZONTAL DUPLEX PLUNGER POWER PUMPS



This unit is equipped with Worthington Synchronized Suction Valve Unloader (patented) on hydraulic press duty in a prominent industrial plant.

Note the following important features

- Totally enclosed, self-oiling, dust-tight power end
- Roller main and pinion-shaft bearings... no adjustment is necessary
- Loads are downward toward foundation
- All parts are near floor... full accessibility
- Metal-to-metal joint on all valve hole plugs... no gaskets to leak
- Heat-treated, drop-forged stainless steel valve service
- Extra deep stuffing boxes with lantern glands for packing lubrication
- Forged-steel liquid end bored from a solid forging

Worthington duplex double-acting plunger pumps, give long life in heavy-duty service . . . with minimum care. The electrically controlled synchronized suction valve unloader with which the pump illustrated above is equipped, establishes a new standard of hydraulic pump control, accomplished efficiently on the low-pressure suction side of the pump with no shocks and negligible maintenance. Bulletins W-412-B40 and W-404-B1 describing this equipment in detail are available on request.

Both the Navy E and Army-Navy E Awards have been presented to Worthington for speed and excellence in production.

PP3-1

WORTHINGTON

WORTHINGTON PUMP & MACHINERY CORPORATION • GENERAL OFFICES: HARRISON, N. J.

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INDUSTRY isn't crystal gazing in looking into the future—the post-war period. Industry has no time for mysticism and is not clairvoyant—but—it is planning for an unprecedented future, taking full advantage of the lessons learned in war-time production.

For instance, it is predicted that magnesium is destined to become one of peace-time industry's most useful materials.

In the famed Dow process, "Monofrax" one of the highly useful super refractories made by Carborundum, is extremely valuable in preventing the highly corrosive action of the charge along the metal lines of the cells.

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Now used chiefly in incendiary bombs, flares and airplane construction, magnesium undoubtedly will be more extensively used in the production of light weight, yet amazingly strong, structural alloys.

Synthetic rubber is another development on the threshold of history making production. And it has been found that in certain processes, special "Carbofrax" tile have helped to make possible faster and greater production.

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Extended uses for such strategic materials as zinc, vanadium and molybdenum are definitely in the plans for post-war developments.

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In the production of all of these highly essential materials, super refractory products by Carborundum are already playing an all important part.

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TO HELP SPEED UP PRODUCTION.

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Degreasing steel shells in Oakite cleaning solution. Tanks are of Monel.

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In the manufacture of munitions and airplane parts, Oakite cleaning solutions are widely used for degreasing steel and aluminum.

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In tank No. 2, Oakite No. 84A cleaning solution removes the remaining flux and rust spots. Next, a rinse removes this cleaning solution in tank No. 3.

The final operation is performed in tank No. 4, where Oakite No. 35S solution treats surfaces, leaving them dry, passivated and rust-resistant. (In the picture, the bale holding baskets above No. 4 tank is sheet Monel.)

Aluminum must be degreased prior to spot welding. For unless all oil, dirt and natural oxide film is thoroughly removed, sound, non-porous welds cannot be obtained.

The oxide film is removed by pickling in Oakite No. 84A cleaning solution at 180° F. Since this deoxidizing solution is corrosive, metal equipment must be selected to resist its attack.

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2S or 3S aluminum is recommended for this purpose. Baskets should be expanded metal coated with synthetic rubber.

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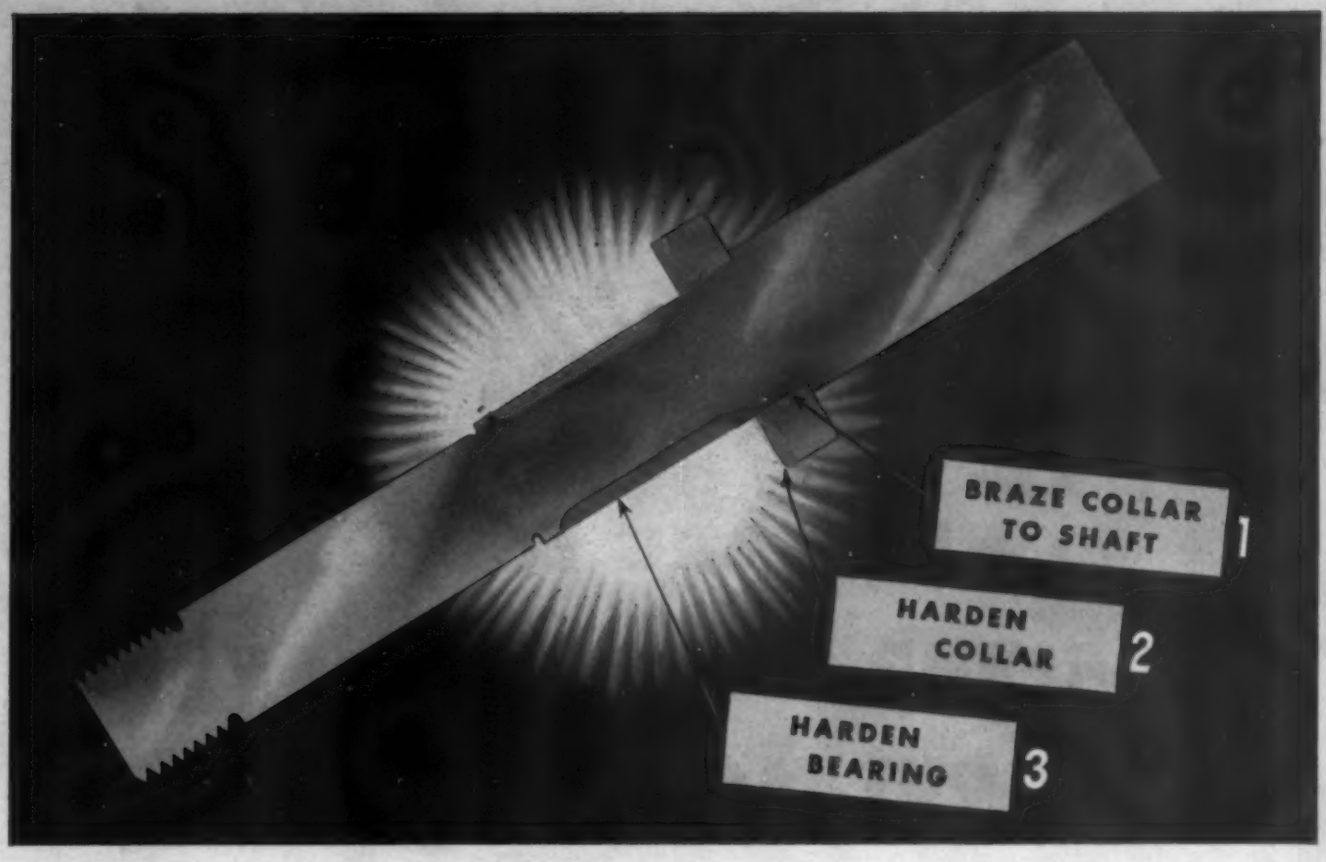

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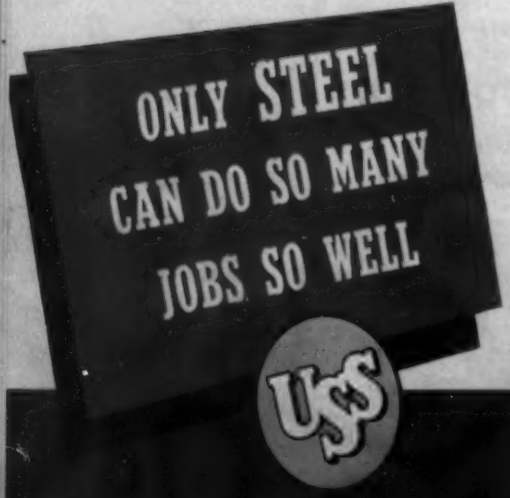

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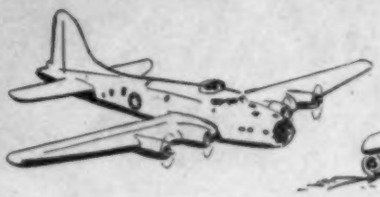
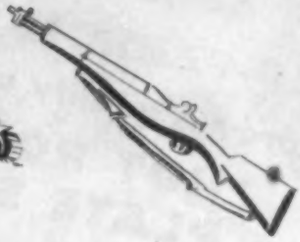


THE FLYING FORTRESS

THE M-4 TANK



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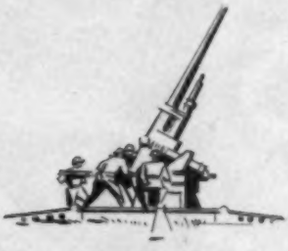
OUR 40-KNOT DESTROYERS



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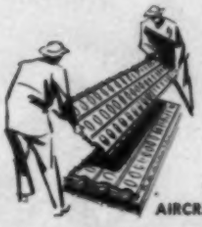
HIGH-SPEED MACHINE GUN AMMUNITION

NEW TYPE STEEL HELMETS



U·S·S AIR-DEK AIRCRAFT LANDING MATS

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Think of any ten items of fighting equipment that are daily proving their worth in the Allied offensive. For example . . . the ten shown above. What is the one material on which all of these depend most heavily for their military effectiveness? It's STEEL! . . . Steel to make them strong and light at the same time. Steel to make them easy to manufacture in mass production. Steel to make them durable, in heat and in cold. Steel to give them just the qualities they must have to meet the needs of our fighting men.

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U·S·S HIGH TENSILE STEELS *to resist corrosion and increase strength without adding weight.*

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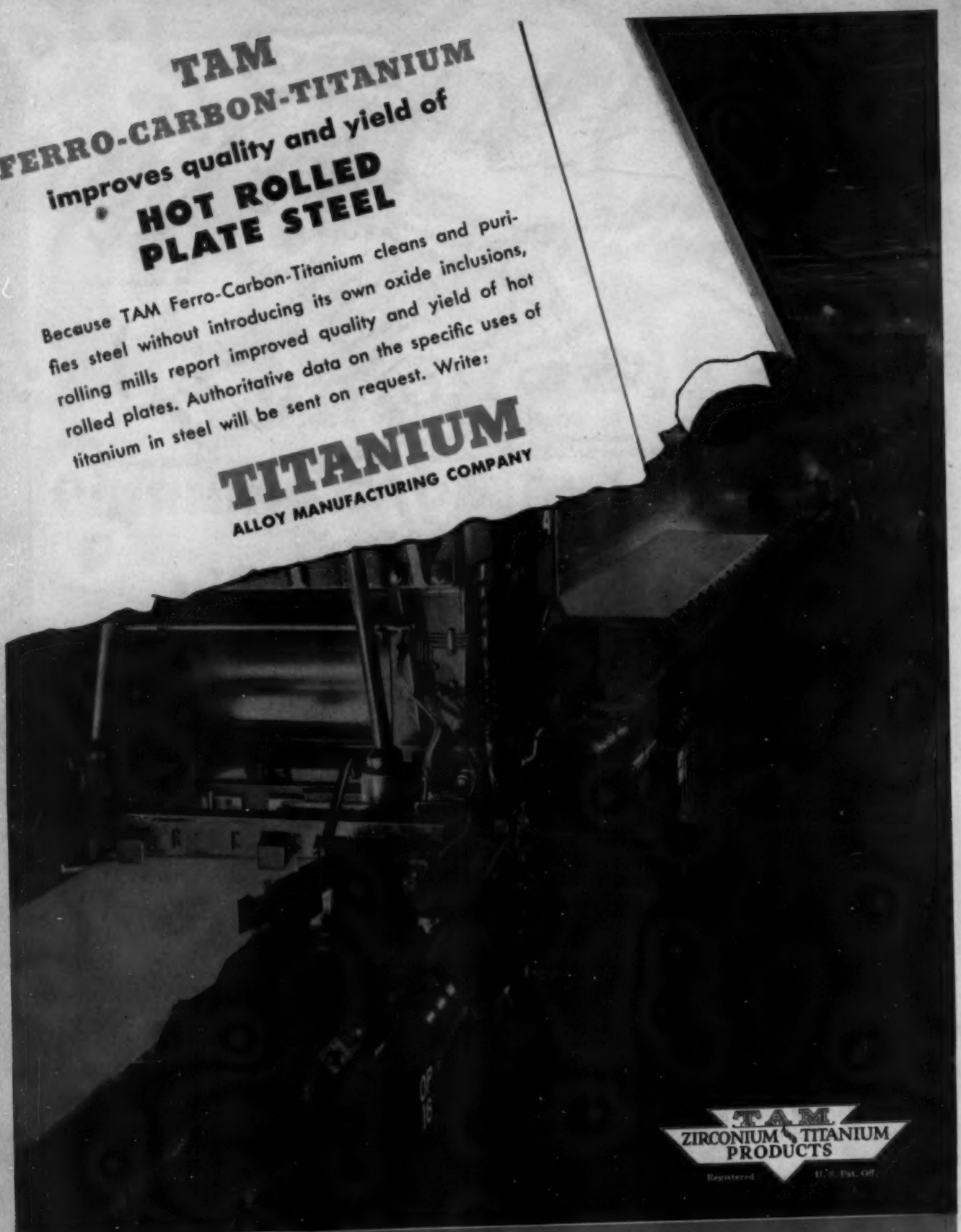

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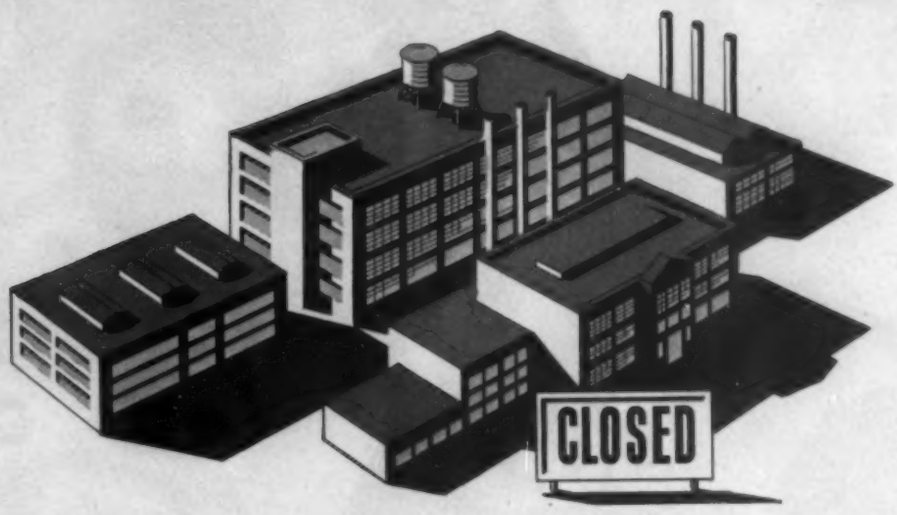
FOR WANT OF A "Part"...
A PLANT WAS CLOSED



EXCEPT for one difficult part, your new product or your present war production may be all set. Failure to procure that one part may block an otherwise successful program . . . might even close your plant!

If a problem of this type is bothering you . . . if it involves redesigning for use or production . . . if you are not fully equipped to make it . . . KAYDON can manufacture it for you, on a production basis, with unfailing precision and assured delivery.

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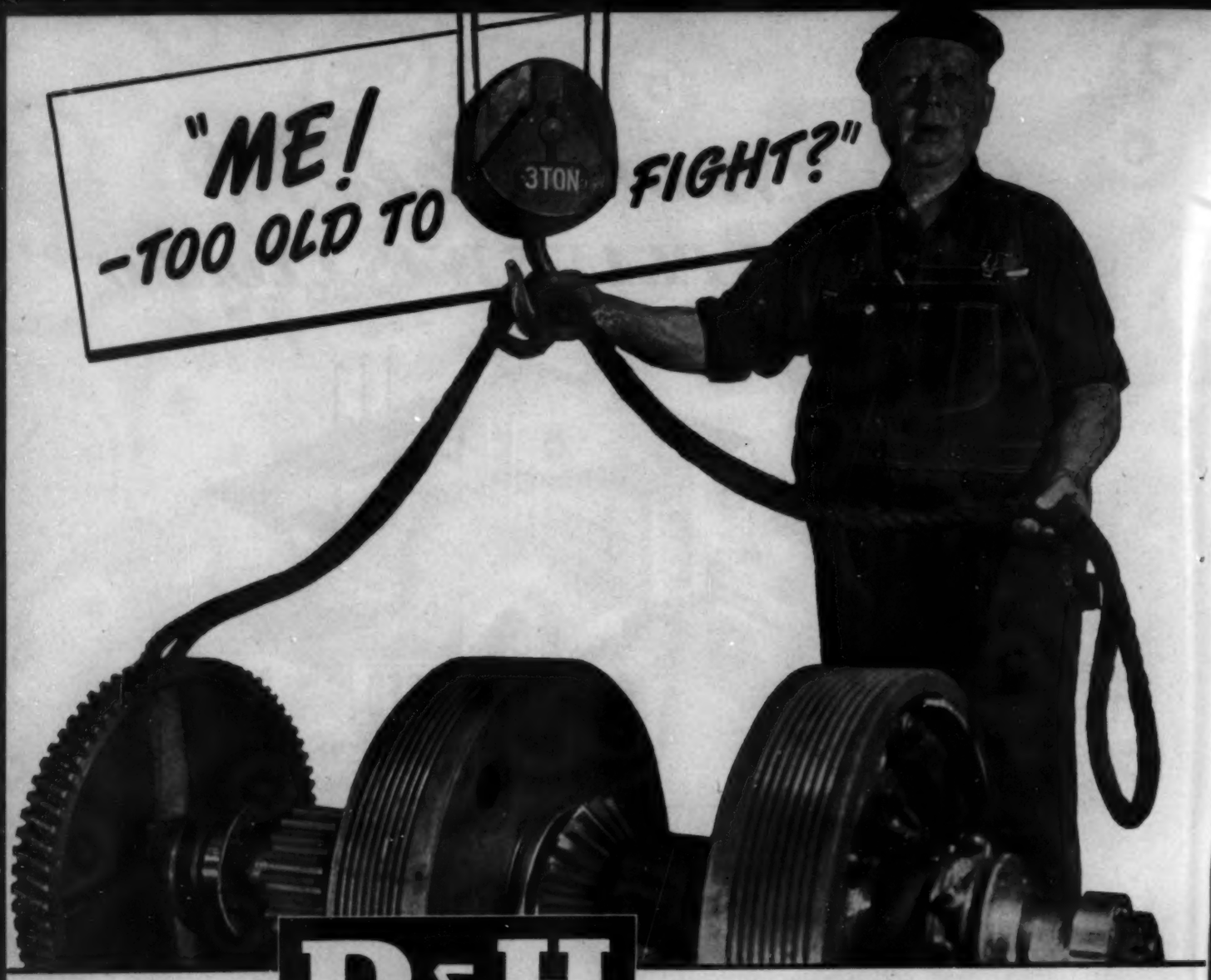
McCRACKEN STREET • MUSKEGON, MICH.

Specialists in Difficult Manufacturing



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A new star has been added to P&H's award for excellence in war production.

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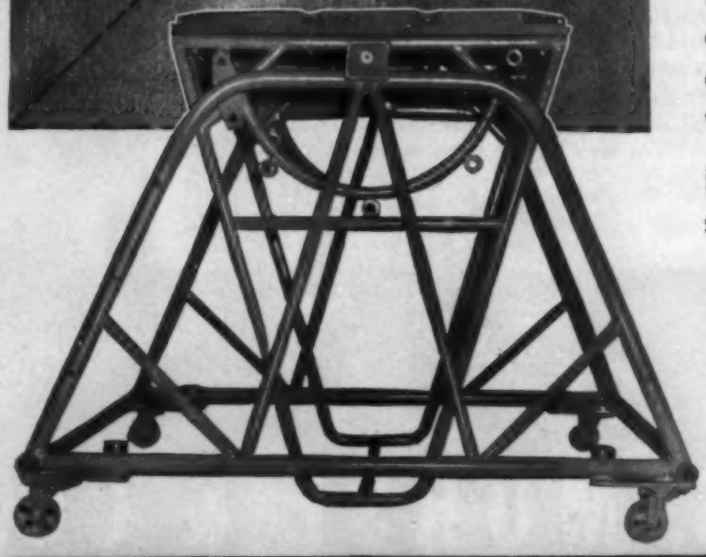
In brief: anything in tubular or plate steel fabrication. *Send your inquiries.*



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THE FLORI PIPE COMPANY • ST. LOUIS, MO.

They Speak a Language the Japs Understand

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From the first day of this war, the crews of U. S. submarines have thus "reasoned" with the enemy—and in his own waters.

They know *action* and *engines*—for they literally live with and by the Diesels which take them there and bring them back.

Many of these Diesels are Fairbanks-Morse Diesels. We feel that nothing short of our level best is good enough for these men of the silent service.

FAIRBANKS, MORSE & CO.

Will Lewis have his way?—
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STEEL

The Magazine of Metalworking and Metalproducing

MARCH 22, 1943

Volume 112 *Number 12*

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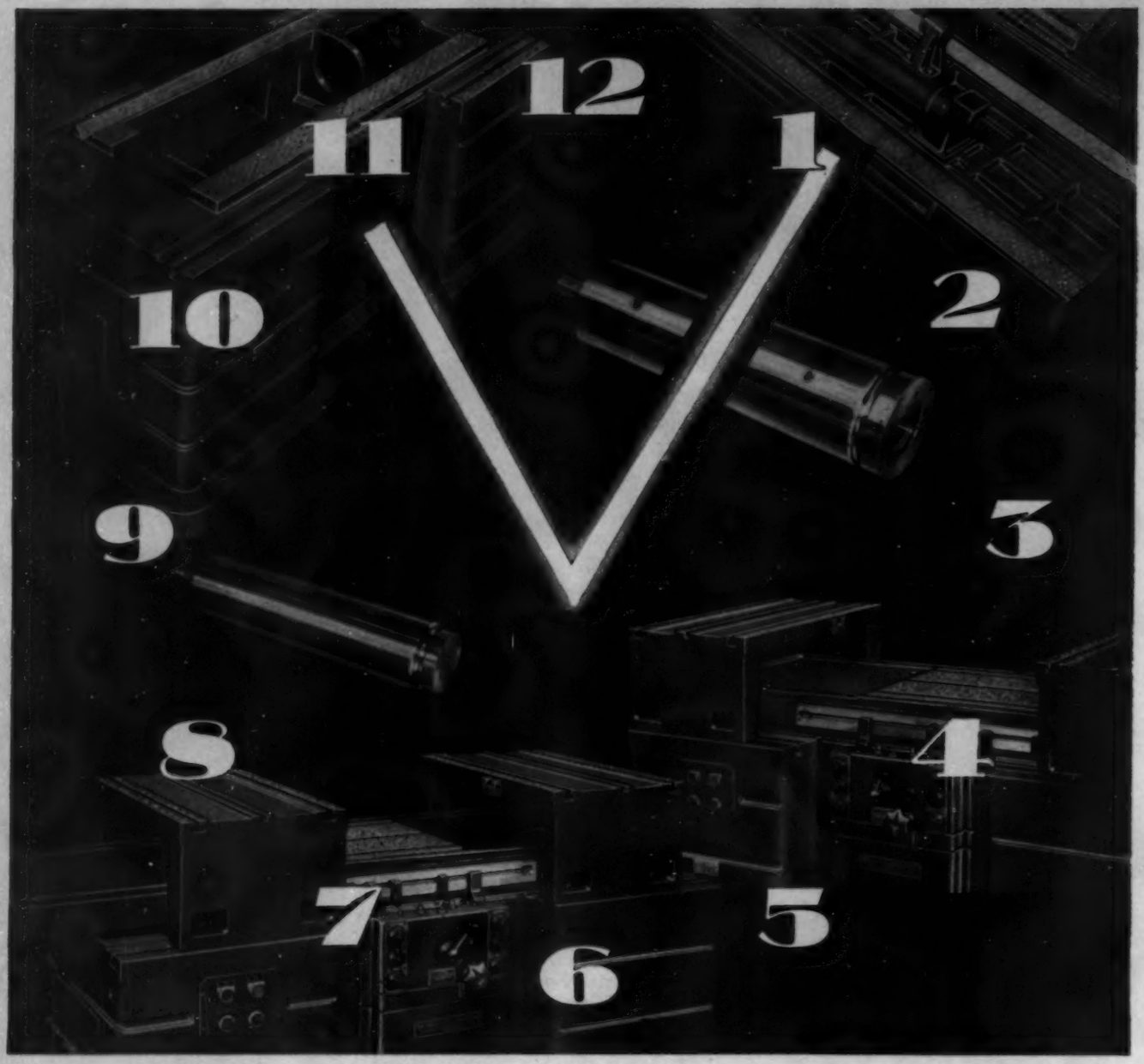

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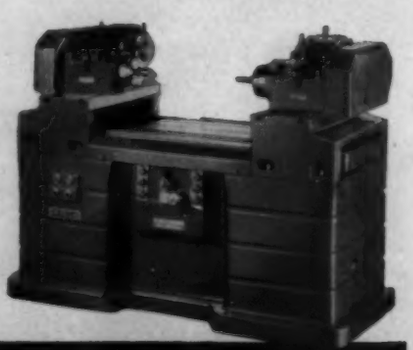
Below: **No. 215-A—one of nine different styles of Ex-Cell-O Precision Boring Machines . . . for boring, turning, facing.**



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HIGHLIGHTING

this issue of STEEL

LABOR The case of John L. Lewis vs. the People of the United States monopolized the home-front spotlight last week (p. 30). Challenging the government's anti-inflation program in its entirety, the United Mine Workers' president threatens to call out his miners if a demand for a $2-a-day wage increase is not met by April 1. A mine shutdown would adversely affect war production in some districts almost immediately, although others could continue at present rates for some weeks. Upon settlement of the miners' demand may hang the fate of the War Labor Board and the whole stabilization program. . . Whether or not professional workers who volunteer to work a half-shift in war plants shall be forced to join and pay tribute to the unions was a problem posed to the War Manpower Commission in Cleveland (p. 123).

WAR PRODUCTION Track and tread mechanisms are vitally important in tank production. To manufacture this important part, United States Rubber Co. leased the Hupp Motor plant in Detroit (p. 49) where its engineers introduced a new process for molding rubber. Buick's production of power trains for medium tanks is discussed at length. . . Exhibits directly related to war production will be displayed (p. 60) at a meeting of the American Society of Tool Engineers in Milwaukee. . . Steel production now is entirely controlled by War Production Board directives (p. 44), adopted on a limited scale last July. Directives have been issued to more than 200 companies, including both integrated and nonintegrated. . . Certain types of war contracts are exempted from renegotiation (p. 53) by the government's procurement agencies. Small plants (p. 53) are obtaining a greater share of direct war contracts.

MATERIALS Copper is the No. 1 critical material this year, WPB Chairman Nelson told the waste materials dealers in Chicago (p. 34). . .Farm equipment manufacturers are faring better in steel and other material allocations (p. 33), but the increased allotments will not benefit spring plantings. . . A manual to assist manufacturers in organizing record-keeping and accounting under the Controlled Materials Plan (p. 45) has been issued.

WASHINGTON Blunt refusal to appropriate funds for continuance of the National Resources Planning Board's postwar studies indicates, Windows of Washington (p. 40) points out, that Congressional leaders are not completely satisfied with the group's work. Legislators in both houses have assumed the leadership in proposing postwar legislation but their efforts are characterized as "slow motion."

IN THE NEWS Industrial companies will aid their employes by providing ground for "Victory Gardens" to alleviate the food shortage this year (p. 54).

President of the D. O. James Mfg. Co., Chicago, recently awarded the Army-Navy "E" for outstanding war production is Miss E. V. James (p. 58).

A billet mill (p. 53) built for Japan but never delivered is being held by the alien property custodian. South American countries and Russia reportedly are bidding for it.

TECHNICAL Alvin von Auw tells how the Bell System is doing a much bigger job yet consuming less raw materials (p. 66). Emphasis is placed on conservation and substitution projects as well as repair and reconditioning of used equipment.

Mass production of the Rolls Royce aircraft engine at Packard Motor Car Co. involves the use of some 75,000 close limit gages. C. Eldridge Stedman describes the methods employed to lick this terrific gaging job which necessitates more than 46,000 gaging operations on each engine (p. 68). He tells how teaching workers the dollars-and-cents value of gages cut gage losses 25 per cent.

A. F. Davis gives examples of use of larger diameter arc welding electrodes (p. 74) and points out that they have cut costs as much as 60 per cent and increased output up to 200 per cent in typical case histories he describes.

With most small die shops in New England and elsewhere reported working on dies for production of cartridge cases and bullet jackets, Frank B. Whittemore's discussion of methods for finishing tungsten tool steel dies in the 3½ to 5 per cent range is indeed timely (p. 76).

Not all steel users are as familiar with the Jominy end-quench test for hardenability as they might be. Thus Republic Steel Corp. information on this test (p. 78) and its use in selecting an alternate NE steel serves a definite need. Much information is also included on the fabricating characteristics of the NE steels.

Murray S. Kice concludes his study of industrial fans (p. 87). . . Conveyorized production lines are being increasingly employed to roll out the warplanes. Typical setups that have been found valuable production aids are detailed by A. D. Palmer Jr. (p. 92).

RYERSON *Immediate* STEEL

United States Troops Advancing on Oran. Photo by U. S. Army Signal Corps.

Helps Make Record Delivery to *AFRICAN FRONT*

BACKING up our fast-moving mechanized Army takes fast-moving production—swift action that starts the minute the order is given, that never sleeps, and that turns out jobs in days, which normally would take weeks to do.

Certain equipment already ashore in North Africa required important alterations to meet unusual battle conditions. The North Africa command said: "RUSH"! The Ordnance Department said: "RUSH"! The Ryerson customer who got the order said: "RUSH"! —and fifty tons of steel were immediately forthcoming from a nearby Ryerson stock.

Result: Delivery to the Army in *one week* of equipment which normally would have taken many weeks to produce. An Army-Navy "E" Award to the manufacturer and a warm letter of thanks to Ryerson.

An unusual case? Somewhat—but typical of hundreds in which Ryerson stocks and Ryerson service have helped get war equipment started *faster*—on their way *sooner* to our fighting men.

In all probability, Ryerson Steel-Service can assist you on your rush war production contracts, if "spot" steel is required. One of the ten strategically-located Ryerson plants is nearby. Phone, wire or write; you'll receive quick personal cooperation!

JOSEPH T. RYERSON & SON, *Inc.*

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CLEVELAND · BUFFALO · BOSTON · PHILADELPHIA · JERSEY CITY

RYERSON STEEL-SERVICE

STEEL
March 22, 1943

Is This the Showdown?

That a coal strike to take effect April 1 is threatened is no novelty to the American public. Throughout the years, the nation has become accustomed to expect a shutdown of the mines on April first—particularly if the country is confronted with a major emergency.

However, the present deadlock which points to a strike next April 1 differs in several respects from those which have occurred previously. This time the issue is not confined to a disagreement between operators and the unions. Also the present dispute has ramifications which go far beyond the scope of wages and hours.

For instance, the recent negotiations between John Lewis and the mine operators were futile for the reason that the latter are not free to grant the union demands even if they desired to do so. Under the price and wage stabilization policy of the government, the employers are not permitted to increase wages except as such increases are approved by the War Labor Board.

WLB already has tried to stand firm on its "Little Steel" formula. The mine workers already have had wage increases comparable to those permitted under this formula. Hence the board cannot grant any increase—even a small one—without "breaking" the formula.

To "break" the formula at this time, and particularly under the crude pressure of John Lewis, would be to invite every labor group in the country to demand increases far in excess of those provided under the "Little Steel" schedule. This, of course, would be tantamount to wrecking the government's entire anti-inflation program.

Thus the threatened coal strike, in common with numerous other disputes now brewing throughout the country, is not exclusively a wage and hour battle between employers and employes, or between operators and union. It is a contest between the power of government and the power of a pressure bloc.

This may be the long awaited showdown. We believe public opinion expects the government to resist the pressure firmly.

E. L. Shaner

Editor-in-Chief

Steel's Supply in Balance as Lewis Threatens To Strike

Shortage will be felt early in some districts. Others have comfortable reserves. . . Wage demand challenges administration's anti-inflation program. WLB's fate may depend on outcome

PROLONGED strike in the bituminous coal industry, as threatened by John L. Lewis if his demand for a $2-a-day wage increase for miners is not granted by April 1, would have a serious effect on many steel and metalworking companies. In some districts, steel producers and other war industries have accumulated comfortable stocks of fuel; in others, the cessation of mining would be almost immediately reflected in war *materiel* production.

In the Youngstown district, a strike lasting only a week to ten days would force the banking of some blast furnaces, while a closedown of three or four weeks would virtually paralyze the area's whole war industry. Ohio Valley plants, on advices from Washington, have been attempting to increase inventories, but present stocks are not as large as they have been in other years of threatened strikes and consumption is considerably greater due to the war program.

Birmingham reports the situation is "rather alarming." Steel mills have no more than three weeks' supply. Pig iron producers could operate at capacity for only two and a half to three weeks. Complete shutdown would be necessary after five weeks. Stocks generally are much lower than they were two years ago.

In the Pittsburgh district, steel plant and coke producers' stocks are large enough that an immediate suspension would not be necessary. Stocks, however, have been declining and are lower than they were last autumn. Inventories in January, according to the Department of Interior, indicated 40 days' supply at the coke ovens, while producers held a 32-day supply. This was a 6 per cent reduction from December, and as the trend in stocks has been downward, it is estimated that present stocks are 5 to 10 per cent below the January figure. Weak point in the situation is the coke ovens, not only for the coke supply, but because by-product gas is used for fuel in open-hearth operations. If the coke ovens are forced to suspend or curtail operations, there will be an immediate decline in steel production, even though producers have stocks of steam coal on hand.

Detroit industries have an average of 60 days' supply. Some of the larger plants are below this figure, one steel mill reporting that April 1 stocks will be "in excess" of 30 days' requirements. Other users have as much as six or seven months' supply. Some small consumers carry virtually no inventories.

The uneven spread of inventories in the Detroit area is an adverse factor, but generally speaking a strike by the miners would have no immediate effect on industrial operations.

In the metropolitan New York area, the larger steel and metalworking companies have about three months' supply. Two upstate metalworking companies report stocks sufficient for four months.

A similar situation exists in eastern Pennsylvania, although several companies would be hit rather hard by a mine shutdown.

The smaller plants and foundries would be the first to suffer in the East. Some of these, without adequate storage facilities or railroad sidings, have only one or two weeks' supply. Some of these believe they could maintain operations longer through emergency arrangements with their regular suppliers.

Chicago steel plants are sufficiently well supplied to preclude an immediate threat to production. Stocks are normal, ranging from six weeks to two months. Steelmakers have been building up inventories as insurance against a possible closedown.

Chief worry that arises in the district is the difficulty in rebuilding stocks after the strike ends. A considerable period would be required for mine stocks to accumulate before the normal flow could be resumed, and difficulties might ensue through strain on the already congested transportation facilities.

In southern Ohio, the strike threat has failed to attract more than passing attention in the iron and steel industry. A Cin-

Bituminous coal miners return to work after month-long strike in 1941. Note happy expressions of men going back to jobs after missing more than four weeks' wages

cinnati supplier said that "reserves are such that other vital activities would be seriously affected before the iron and steel industry."

Southern Ohio area steelmakers believe they are in a more favorable position than some other sections due to proximity to the mines, availability of water transportation and a general policy of building up inventories.

Cleveland district stocks generally are normal and most operators believe the miners' case will be settled before serious interference with operations.

Causing some concern is the coincidence of the threatened strike with the opening of the Great Lakes shipping season. With a record movement of 52,000,000 tons scheduled, a strike at the start of the season might seriously affect the attainment of this goal.

Lewis Threatens Stabilization Program

Mr. Lewis' demand for $2-a-day increase is considered the most powerful single offensive against the tottering defenses against inflation yet launched. Were such a wage concession granted, a deluge of similar demands from other unions would follow. Effect would be to release the brakes on inflation and wages and living costs would race for the top.

Such, apparently, is Mr. Lewis' determination. He has vowed he would smash the War Labor Board's "Little Steel" wage formula. He has been an enemy of the anti-inflation program and argues that inflation is inevitable in wartime. He contends that increases in the cost of living justify the demanded wage increase.

The attitude of the operators under present conditions is largely academic. They are powerless to grant the increase without the sanction of the War Labor Board. About all they are able to do is to reply "preposterous" to Mr. Lewis' oratory. Any considerable increase in wages would necessitate an increase in the price of coal, which, if comparable to the wage increase, would leave the operators in about the same position they now are.

The War Labor Board, according to Mr. Lewis himself, already has made up its collective mind to refuse the increase. It could take no other course without scuttling its entire program.

At Scranton, Pa., a couple of weeks ago, Mr. Lewis referred to the WLB, the Office of Price Administration and James Byrnes, director of economic stabilization, as a "packed court," which had decided against the miners without even hearing their case.

John L. Lewis, dictator of the miners, defies a nation at war. Economists agree that if he is successful in his demand for a $2-a-day wage increase, the anti-inflation program, already tottering, will be wrecked

By his own admission, the cards would appear to be stacked against his winning the wage increase. However, Mr. Lewis has a record for winning concessions under seemingly adverse conditions.

Just before Pearl Harbor, he was insisting on a closed shop for workers in the "captive" mines. The President had declared that the government would force no man to join a union against his will. Mr. Roosevelt promised Congress that the essential mines would not be allowed to close. However, the mines did close, despite the President's appeals to Lewis, and a few days later an arbitration committee—composed of Mr. Lewis, B. F. Fairless of United States Steel Corp., and Dr. John Steelman of the pro-labor Department of Labor—voted two to one for the closed shop in the captive mines.

In previous contract negotiations, Mr. Lewis has won important concessions. By virtue of his dictatorship over the United Mine Workers, he is able to call and maintain strikes for indefinite periods. He has defied the government to break his strikes and is noted for the slogan: "They can't dig coal with bayonets."

One possible means of settling the case lies in the President's recent decree for a 48-hour week in war industry. It would be possible for the War Manpower Commission to declare coal mining a war industry on a nationwide basis, as was done with nonferrous metals mining and the lumber industry.

Then, although the miners would work a longer work-week—48 hours compared to the present 35—they would receive a greater wage increase than Mr. Lewis now is asking.

For the standard work-week of five 7-hour days the miner gets $35. With the $2-a-day increase he would receive $45

Ordinarily, 750,000 tons of coal was stocked in this yard. A strike quickly reduced reserves to 75,000 tons

for the same amount of work. But if the 48-hour week policy were extended, the miner would get $54.50—standard $1 an hour rates for the first 35 hours and time-and-a-half rates of $1.50 for the additional 13 hours.

Such a policy could be stated by both sides in such a way as to save their respective faces.

Pending decision in the miners' case, other labor leaders have been growing more restive. Following the WLB's decision in allowing a 5½-cent hourly increase to employes of the Oliver Mining Co., high CIO leaders declared the ruling had broken the "Little Steel" formula. They contended that the Oliver employes had previously been granted increases of 15 per cent over their Jan. 1, 1941, rates and that the latest raise was above the "Little Steel" formula.

Deny Formula Broken

The WLB, however, indicated it was not necessarily a break in the formula but rather an exception under the clause permitting exceptions in the case of inequities. The inequity in the case was the fact that the mining company employes were not granted a wage increase when other subsidiaries of the United States Steel Corp. were increased. Since a uniform increase in all subsidiaries had been the corporation's policy for years, the board ruled that in this case an inequity would be established unless an equivalent raise were granted.

Most workers already have received the 15 per cent increase allowed them by the "Little Steel" formula and union leaders are wondering how much longer the membership can be kept in line if no further increases are forthcoming.

Past Strikes Cost Weeks of Production

Strikes in the bituminous coal fields occur in the spring of odd-numbered years, when the biennial agreements expire.

In 1941 miners were out four weeks in April, finally returning to work after the case had been certified to the Defense Mediation Board. Point at issue was wage differentials between northern and southern miners. After resumption of mining southern operators and miners negotiated the question of a 40-cent differential in daily wages between northern and southern schedules and slowness in reaching an understanding caused threat of renewal of the strike, which was ended by an agreement being reached.

This strike, coming at a time when the steel industry was straining for capacity production, caused at least 20 blast furnaces to bank and others went on half-blast to conserve coke. Steelworks operations dropped several points and predictions were made that continued mine idleness would reduce steel production to 50 or 60 per cent of capacity.

Operation of the Great Lakes ore fleet was threatened, at one time only sufficient coal being on hand for two round trips. The effort to bring down 75,000,000 tons of ore thus was put in jeopardy.

Production of iron and steel was curtailed in the Chicago, Cleveland, Youngstown, Birmingham and Pittsburgh districts and other centers were threatened. On resumption coke users borrowed from each other to maintain production of pig iron until a new supply started.

In April, 1939, mining was suspended for three weeks but little effect was felt

(*Please turn to Page* 123)

Apparently huge coal reserves now held by most steelmakers won't last long if Lewis closes down the country's mines. NEA photos

Larger Equipment Allotments "Too Late for Spring Planting"

CHICAGO

OUTLOOK for the production of farm equipment currently appears brighter than it has at any time this year. Although manufacture continues on a restricted basis, a fair amount of steel is being obtained by units in the industry to permit making headway against the quota which recently was enlarged to almost double the figure originally established by WPB. Despite this, however, the increase came too late to make any considerable amount of new equipment available to farmers for spring planting. Chief benefit will accrue later in the year.

Prospects for equipment manufacturers obtaining an increase in materials necessary to expand their production in line with the country's higher food goals look "somewhat more hopeful," stated Cal Sivright, president, Oliver Farm Equipment Co., Chicago, following the stockholders' annual meeting, March 16.

Operation of CMP, he explained, while confusing in its early phases appears likely to benefit the farm machinery industry. Current Washington opinion is definitely toward providing farmers with more new power farming equipment. Discussing the company's present production program, Mr. Sivright said that probably 65 per cent of billings for the current fiscal year will be on war contracts. The company's government business has not yet been renegotiated.

In recent weeks, International Harvester Co., Chicago, has been unable to obtain a larger supply of materials for farm machinery, but it will not be able to produce and distribute its full quota of certain types of equipment in time for the spring planting season.

Charge Belated Production

Farmers had complained that the WPB order early this month permitting increases for some machinery is valueless in aiding crop production because the implements cannot be manufactured and distributed in time for the "using season."

Fowler McCormick, International Harvester president, said that the company did not have enough material on hand to meet the accelerated government production program in the first quarter of this year.

A company spokesman stated a few thousand tons of steel have been obtained and rolled in the company's own mill since then and a higher priority rating also has helped to some extent.

For second quarter, it is understood, Harvester will operate under CMP, and it is hoped this will yield more steel for farm implements than under the priority system. The WPB increase of machinery quotas came too late to be of real aid in planting, but "the company will build just as fast as it can."

A minimum of 90 days is required to build farm machinery and place it on the farm after authority has been given for production, according to the spokesman, and further delay occurs in distribution because of rigid Department of Agriculture controls over permits as to where the machinery is to be sent.

Complain Ration Certificates Useless

Illinois farmers, protesting recently that they could not meet increased crop goals under existing machinery shortages, said at a mass meeting in Monticello, Ill., that their machinery ration certificates are useless because the implements are not available. Lack of corn planters, grain drills, cultivators, harrows, and plows, is said to be preventing planting.

Because of lack of materials and delay in the machinery increase order the industry in general is reported to have been unable to produce and distribute enough machinery in time to aid spring planting materially. Hope is held, however, that enough materials can be obtained to avoid this situation at harvest time.

Japanese Evacuees Sell Their Farm Equipment

Most of the farm equipment owned by Japanese and Japanese-Americans at the time of their evacuation from the Pacific coast states already has been disposed of and will be used in the 1943 farm production, a report from the War Relocation Authority reveals.

Representatives of the WRA property office are endeavoring to arrange for the sale or lease of about 150 tractors still in the hands of evacuees, and recently have negotiated the sale of 43 pieces of farm equipment. Other types of farm implements also must be sold.

The handling of the property of the evacuated people has been turned over to the WRA from the Federal Reserve Bank and the Farm Security Administration, and an Evacuee Property Office of WRA has been established in San Francisco with branch offices in Los Angeles, Portland and Seattle.

PONTIAC NOW A LEADER IN ANTIAIRCRAFT GUN OUTPUT

BOFORS-TYPE 40-millimeter field guns on the assembly line in a Pontiac Motor Division plant. Production of these weapons, along with 20-millimeter Oerlikon antiaircraft cannon, makes Pontiac one of the largest producers of antiaircraft equipment in the country

Copper Now No. 1 Critical Metal, Nelson Tells Waste Trade Dealers

CHIEF problem confronting members of the waste trade industry is that of accelerating collection, preparation and flow of scrap metals and other salvage to the nation's war goods producing plants. This was emphasized by government spokesmen and representatives of the trade at the thirtieth annual convention and Wartime Conference of the National Association of Waste Material Dealers in Sherman hotel, Chicago, March 16-17.

Emphasis in 1942 was on iron and steel scrap but this year it is on copper-bearing materials. A telegram which Donald M. Nelson, chairman, WPB, Washington, sent to the convention said in part: "It is important in 1943 to devote special attention to copper and copper-bearing scrap, for copper is our No. 1 critical metal. We need all we can get and as quickly as we can get it."

The message was delivered personally by Paul C. Cabot, director, salvage division, WPB, Washington, who asserted that the theme of a nationwide drive now being organized is to move all copper that is at present in nonessential use, that can be replaced, and that does not have some special historical value.

Seek Peoples' Co-operation

Commenting on the success that attended the drive for iron and steel scrap, Mr. Cabot said the salvage division early in its efforts had adopted the axiom of stimulating the flow through normal trade channels, and that this policy would be continued. Further, salvage drives would be conducted on "a democratic basis" by getting the populace to co-operate.

He reported that the WLB has approved increased wage rates for scrap yard workers, a move which was initiated by members of the Institute of Scrap Iron and Steel Inc., in Chicago, and that this should have a salutary effect throughout the country, since it probably would be used as a pattern elsewhere.

Mr. Cabot suggested that the public relations effort of the scrap industry is considerably less than it should be, and many benefits would accrue through a better job. During the iron and steel scrap drive, many complaints were made against the industry. All of these were investigated and except in a small number of cases, representing only a fraction of 1 per cent, charges were not true.

At present, battlefield scrap, considerable in tonnage, but small in percentage, is beginning to reach this country. However, it has been found that bringing this material back to this country delays ship turnaround by from 10 to 20 days, consequently an effort will be made to do without this scrap for the present.

Mr. Cabot reported that due to the excellent performance of the industry no steelmaking capacity has been idle for want of material since last mid-year. The salvage division is attempting to get away from all subsidies in connection with scrap and is succeeding fairly well. Out of 29,000,000 tons of scrap handled through dealers last year, the scrap division had a hand in only about 1,500,000 tons, and of this little more than 300,000 tons involved a subsidy in its moving. Last December, it was decided that no project would be handled which required a cost of over $40 a ton. This will bar the taking up of any more street car rails—of which few are left imbedded in streets—since the cost of lifting ranged from $50 to $70 a ton.

Addressing the convention at its opening session, Dean William H. Spencer, regional director, WMC, Chicago, presented the government's approach to the manpower problem. He asserted that 6,000,000 new workers must be recruited for war industry by the end of 1943, and that about 2,000,000 of these must be women. All waste industry workers are now classified as "essential," but this does not defer them permanently from the armed services. Thus it is imperative that the yards train older men, hitherto unemplovables, and women to take the places of men under 38.

Copper was widely discussed at the meeting of the Secondary Metal Institute. Guy P. Norton, chief, scrap branch, copper division, WPB, Washington, commended highly the achievement of copper scrap dealers. In 1942, he said, 55 per cent more copper ingots were produced than in 1940, and less virgin copper was consumed. This was because of the large volume of scrap collected. Mr. Norton emphasized that the demand for copper this year exceeds by a wide margin the apparent available supply, and he asked dealers for an increase in the flow of scrap.

J. A. Mirel, tin-lead division, WPB, Washington, pointed to the urgency of conserving tin, since our chief outside source of the metal continues cut off.

Revised price schedule No. 20 on copper scrap, just announced and effective March 22, was explained in considerable detail by Fred Wolf Jr., chief counsel, metals branch, OPA, Washington. This schedule presents ceiling prices for 16 new grades of copper and brass scrap not previously listed. New regulations also include new quantity premiums on shipments.

Elect New Officer

David Feinburg, David Feinburg Co., Boston, was re-elected president of the National Association of Waste Material Dealers. Other officers are: Nathan Kurtz, M. B. Speer Inc., Pittsburgh, first vice president; Joseph Tyroler, Tyroler Metals Inc., Cleveland, second vice president; and Julius Muehlstein, Muehlstein & Co. Inc., New York, third vice president. Charles M. Haskins was re-elected secretary, treasurer and managing director.

Samuel Zeldes, City Metals Refining Co., Detroit, was re-elected president of the Metal Dealers Division. Herman Ladenson, Ladenson Metals Co., Philadelphia, will continue as first vice president; and Phil Moskowitz, Moskowitz Bros., Cincinnati, second vice president. Charles M. Haskins, New York, was re-elected vice president.

The Secondary Metal Institute took no action on new officers, leaving this to its executive committee for later decision. It was announced, however, that its president, Ben Friedman, Metals Refining Co., Hammond, Ind., has consented to become affiliated with the serap branch, copper division, WPB, Washington.

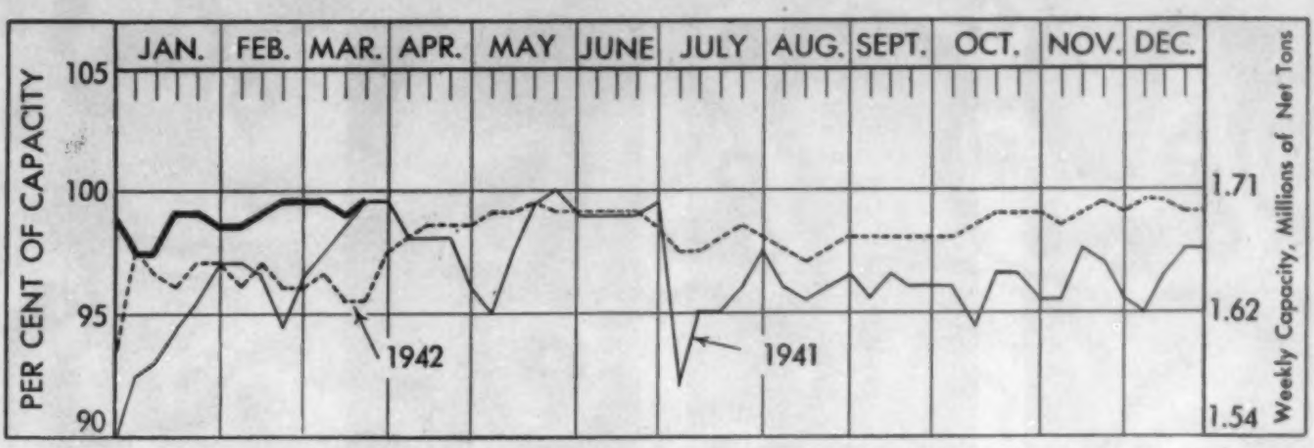
Estimate Steel Scrap Needs at 25,000,000 Tons in 1943

Purchased steel scrap requirements for 1943 have been increased by government agencies to 25,000,000 gross tons from 21,000,000 tons estimated earlier this year. The latest figure compares with 27,000,000 tons of purchased scrap shipped in 1942.

It now is estimated that open hearths will need 15,000,000 tons; electric furnaces, 1.350.000; blast furnaces, 1,650,000 and foundries 7,000,000.

The railroads are expected to supply 2,500,000 tons of steel scrap this year, while 16,000,000 tons is scheduled for collection from industrial sources. The remainder, 6.500,000 tons is to be collected from automobile graveyards, farms and special projects.

A more extensive effort is under way this year to collect farm scrap.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,405	6,811	....	....	....	....	....	....	....	....	....	....
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	....	....	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Ingot Rate 99½ Per Cent, Up ½-Point

Production of open-hearth, bessemer and electric furnace ingots last week was at 99½ per cent of capacity, a rise of ½-point from the prior week. Seven districts made small gains, two declined and three were unchanged. A year ago the rate was 95½ per cent; two years ago it was 99½ per cent, both based on capacity as of those dates.

Pittsburgh gained 1 point to 101 per cent, highest since March, 1941, when it reached 103 per cent. Other gains were 1 to 4 points, resulting from shifts in active furnaces and lighting of repaired units. The drop at Chicago resulted from computation on the basis of the larger capacity as of Jan. 1, and does not indicate a loss in tonnage. .

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Mar. 20	Change	Same week 1942	Same week 1941
Pittsburgh	101	+1	94	101.5
Chicago	98.5	—2.5	104	101.5
Eastern Pa.	95	None	88	96
Youngstown	98	+1	95	97
Wheeling	88.5	+4	81.5	88
Cleveland	93	+2.5	91	98
Buffalo	90.5	None	79.5	93
Birmingham	100	None	95	90
New England	92	—3	100	100
Cincinnati	88	+3	87	93.5
St. Louis	91	+3	83	99
Detroit	92	+1	83	89
Average	99.5	+0.5	*95.5	*99.5

*Computed on bases of steelmaking capacity as of those dates.

"2,000,000 Tons of Steep Rock Per Year"

Production of high-grade iron ore at an annual rate of 2,000,000 tons is planned by Steep Rock Iron Mines Ltd., Toronto, which last week announced conclusion of negotiations for $8,727,500 to finance development of its property west of Port Arthur, Ontario, as an essential war project.

In the annual report to shareholders, D. M. Hogarth, Steep Rock president, says construction work at the mine is being expedited to bring it to the production stage within 17 months. Mr. Hogarth stated that a sales commitment averaging 1,000,000 tons annually for the first ten years of production had been obtained by Premium Iron Ores Ltd., sales agency organized by Cyrus S. Eaton of Cleveland to market Steep Rock ores and handle transportation and insurance. Mr. Eaton and associates, who hold a 37 per cent equity in the mining project, have given a minimum guarantee to dispose of 500,000 tons of ore a year, drawing 2 per cent sales commission.

About $1,000,000 already has been expended on the property, which is to receive new financing as follows: $5,000,000 of United States funds, secured by 4 per cent first mortgage bonds, from Reconstruction Finance Corp.; $2,025,000 from a 5½ per cent debenture issue underwritten by Otis & Co., Cleveland; $1,000,000, if required, from Steep Rock's sales agent, Premium Iron Ores Ltd.

FEBRUARY PIG IRON OUTPUT HIGHER THAN YEAR AGO

Pig iron production in February totaled 4,710,109 net tons, with ferromanganese and spiegeleisen 55,892 tons, a total of 4,766,001 tons, American Iron and Steel Institute reports. This compares with 5,194,245 tons in January and 4,500,478 tons in February, 1942. Per cent of capacity engaged in February was 98, against 100.7 in January and 97.4 in February last year.

Net tons

Districts	Annual capacity	Pig iron	Ferro, spiegel	Total	Per cent capacity
Eastern	12,868,680	867,361	17,703	885,064	89.7
Pittsburgh-Youngstown	25,732,160	1,977,958	18,498	1,996,456	101.1
Cleveland-Detroit	6,125,110	462,156	.....	462,156	98.4
Chicago	13,081,540	1,012,207	.....	1,012,207	100.9
Southern	4,425,540	319,514	19,691	339,205	99.9
Western	1,134,100	70,913	.....	70,913	81.5
Total	63,367,130	4,710,109	55,892	4,766,001	98.0

During 1941 the companies included above represented 99.8 per cent of the total blast furnace production.

MEN of INDUSTRY

R. G. PATTERSON

W. J. McILVANE

THOMAS BROWN SR.

T. W. PLANTE

Robert G. Patterson has been appointed general sales manager, Lamson & Sessions Co., Cleveland. Mr. Patterson joined Lamson & Sessions in 1935 as merchandising director, and the past three years has been in charge of wholesale and industrial sales through the company's branch offices in Chicago, New York, Birmingham, St. Louis, Salt Lake City, Los Angeles, San Francisco and Seattle.

—o—

William J. McIlvane, general manager of sales, Copperweld Steel Co., Glassport, Pa., has been appointed vice president in charge of sales and assistant to the president.

—o—

Curtner B. Akin has been elected vice president and general manager, United Tube Corp., Ellwood City, Pa.

—o—

Robert Miller, vice president and secretary, Menasco Mfg. Co., Los Angeles, has been promoted to executive vice president and secretary.

—o—

Dale M. Harpold, vice president, Vulcan Stamping & Mfg. Co., Bellwood, Ill., has taken an indefinite leave of absence to become associated with the War Department in Africa.

—o—

James C. Hart, former executive vice president, Federal Machine & Welder Co., Warren, O., has been elected president, Taylorcraft Aviation Corp., Alliance, O.

—o—

Albert L. Cuff, William Frew, and **Charles M. Thorp Jr.** have been elected directors, Blaw-Knox Co., Pittsburgh, to fill vacancies on the board. Mr. Cuff has been affiliated with Blaw-Knox since 1928 and has been secretary and general counsel since 1937. Mr. Frew is a partner in the New York stock exchange firm of Moore, Leonard & Lynch, while Mr. Thorp is a member of the law firm of Thorp, Bostwick, Reed & Armstrong.

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Thomas Brown Sr., since 1938 assistant superintendent of blast furnaces, Otis Works, Jones & Laughlin Steel Corp., has been advanced to superintendent, while **T. W. Plante,** heretofore assistant superintendent of Eliza furnaces, Pittsburgh, has been promoted to superintendent of furnaces, coke works and ore docks in Cleveland.

L. C. Steele, who has been assistant master mechanic at Eliza furnaces, Pittsburgh, will succeed Mr. Plante as assistant superintendent, and **D. W. Smith,** of the combustion department, will succeed Mr. Steele as assistant master mechanic.

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Ellsworth E. Kimmel, former research chemist with Carnegie-Illinois Steel Corp., has been appointed to the research staff of Battelle Memorial Institute, Columbus, O., and assigned to its division of chemical research.

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Herbert W. Pfahler has been elected assistant treasurer and director, National Bronze & Aluminum Foundry Co., Cleveland. **George N. Wright,** vice president, has been elected to the board, and all other officers and directors have been re-elected.

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Charles G. Atkins, formerly vice president in charge of engineering, H. K. Ferguson Co., Cleveland, has been elected president, Osborn Engineering Co., Cleveland. **Kenneth H. Osborn** has been elected secretary of the Osborn company, and **T. T. Hubbard,** vice president and treasurer.

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Henry J. Hogue, general superintendent, Wasmer Bolt & Screw Corp., Cleveland, has been promoted to vice president, while **Joseph Auer Jr.,** heretofore assistant superintendent, has become general superintendent, and **James S. Rignall,** secretary.

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Norman C. Einwechter, heretofore a special representative for Carpenter Steel Co., Reading, Pa., has been appointed assistant to the vice president. Mr. Einwechter's offices will be located in New York and Philadelphia.

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R. S. Neblett, assistant manager of General Electric Co.'s Turbine Division, Schenectady, N. Y., for more than three years, has been appointed assistant manager of the company's Federal and Marine Division.

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Herbert W. McKeague, formerly assistant purchasing agent, Radio Division, Westinghouse Electric & Mfg. Co., Baltimore, has been appointed purchasing agent in the Transformer Division of the company's Sharon, Pa., works.

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Arthur W. F. Green has been appointed materials engineer administrator, Heat Treating and Plating Divisions, N. A. Woodworth Co., Ferndale, Mich. Formerly materials engineer for Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn., Mr. Green has been associated with the steel and metals industries since June, 1916.

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D. C. Williams, formerly associated with the research laboratories of American Steel Foundries, East Chicago, Ind., has been appointed by the American Foundrymen's Association, through its subcommittee on physical properties of steel foundry sands at elevated temperatures of the foundry sand research

committee, to a fellowship at Cornell University, Ithaca, N. Y., maintained by the association for the study of the properties of foundry sands.

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William D. Reed has been elected vice president, Sawhill Mfg. Co., Wheatland, Pa. The past year he has been general sales manager of the company and before that was affiliated with the Republic Steel Corp., Pipe Sales Division, in Youngstown, Cleveland and Chicago.

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Howard M. Givens Jr., manager of tool steel sales for Allegheny Ludlum Steel Corp., Brackenridge, Pa., has transferred his headquarters to the corporation's Dunkirk, N. Y., offices. Mr. Givens became manager of tool steel sales in 1941. The shift is intended to centralize both the sales and manufacturing supervision of tool steels at the Dunkirk plant.

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Gene P. Robers has been appointed advertising manager, Weatherhead Co., Cleveland, succeeding **Robert H. Weatherhead**, who has joined the armed services. Mr. Robers was formerly advertising manager, Atlas Car & Mfg. Co., Cleveland, and previous to that operated his own industrial advertising agency.

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Malcolm Morgan has been named superintendent of blast furnaces and coke plants in the southern district operations of Republic Steel Corp., and **Daniel Hernan** has been made superintendent of transportation at the corporation's Gulfsteel Works, Gadsen, Ala. Both Mr. Morgan and Mr. Hernan were formerly associated with the Youngstown, O., offices of Republic.

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J. Russell Duncan, secretary, Peerless Machine Co., Racine, Wis., has been named general manager. Mr. Duncan went to the Milwaukee-Chicago area from the West, four years ago, where he attended the University of Arizona. He is on the board of directors of Ben-Hur Mfg. Co., Milwaukee.

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L. G. Bean, vice president and general sales manager, Bristol Co., Waterbury, Conn., has become vice president in charge of engineering and sales. **Harry E. Beane**, field sales manager, has been made sales manager, and **E. L. Stilson**, associated with the company's field department, has been named assistant sales manager.

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C. E. Robinson, former district sales manager, and recently assistant manager of sales, Mid-West Forging & Mfg. Co., Chicago, has been elected general manager of sales. Associated with the company 11 years, Mr. Robinson has represented it in Dallas, Tex., St. Louis, and had been in charge of the entire southern territory for six years.

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T. A. Reynolds, the past 30 years an employe of McConway & Torley Corp., Pittsburgh, has retired as superintendent of the company's foundry. He is a past president, Pittsburgh Foundrymen's Association and has been a member of the executive board of that organization for 10 years.

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Cuyler S. Patton, manager of sales, Alco Products Division, American Locomotive Co., New York, has been elected president, Tubular Exchange Manufacturers Association. Mr. Patton has been prominent in the activities of the association for many years and has served several terms on its executive committee.

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William G. Reichert has resigned as chief foundry metallurgist, American Brake Shoe & Foundry Co., New York, to organize the W. G. Reichert Engineering Co., to specialize in the mechanization, appraisal and improvement of foundry operations, to increase production, improve quality and aid management in the manufacture of centrifugal castings and conversion of steel. Offices of the company are located in the Industrial building, 1060 Broad street, Newark, N. J.

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M. I. Alimansky has been named engineer in charge of the capacitor section, Pittsfield works, General Electric Co., Pittsfield, Mass. **Charles F. Miller** succeeds Mr. Alimansky as manager of capacitor sales, while **Fred G. Stebbins** has become assistant manager of sales, distribution transformer and feeder regulator section.

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Edward C. Myers, assistant director of public relations, Pittsburgh district, United States Steel Corp. Subsidiaries, has joined the staff of the director of industrial relations, United States Steel Corp. of Delaware, as senior staff assistant in charge of personnel. **Eric Ferguson**, of Carnegie-Illinois Steel Corp., has been transferred to the staff of the director of public relations, United States Steel Corp. Subsidiaries, Pittsburgh district.

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A. B. Openshaw has been appointed manager of the Chicago district sales office of Combustion Engineering Co, Inc., succeeding the late James D. Harrison. Associated with the company since 1924, Mr. Openshaw has been engaged in sales work in the New York, Boston, Cincinnati and Chicago territories, more recently being attached to the Hedges-Walsh-Weidner Manufacturing Division of the company.

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W. A. Steele has been made general superintendent of Wickwire Spencer Steel Co.'s Buffalo works, succeeding **Fred Johnson**, who is retiring after more than 20 years with Wickwire at its Buffalo

J. RUSSELL DUNCAN

CUYLER S. PATTON

W. G. REICHERT

W. A. STEELE

plant. Mr. Steele formerly was with Crucible Steel Co. of America where he started, in 1923, as a laborer in the blast furnace department, and advanced to assistant general superintendent, which position he held at the time he joined Wickwire. **Bennett Lodge** has been named assistant general superintendent of the Buffalo works.

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Edward Beard White has been named sales manager in the western territory for Eutectic Welding Alloys Co., New York. Mr. White has had 18 years experience in technical and industrial fields, more recently being engaged in welding engineering and sales promotion in connection with the new Castolin Eutectic low temperature welding process.

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F. O. Cooper has been appointed manager, sheet and strip bureau, metallurgical division, Chicago district, Carnegie-Illinois Steel Corp. His service began in 1905 when he was employed as a weighmaster at the Monessen, Pa., plant of American Sheet & Tin Plate Co., which later became a part of Carnegie-Illinois. In 1925 Mr. Cooper was named assistant to manager, Gary sheet mill, and ten years later was transferred to the metallurgical department as a contact representative.

EDWARD B. WHITE

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Orville T. Barnett, engineer of tests for Murex arc welding electrodes, Metal & Thermit Corp., New York, has been made production engineer for both arc welding and Thermit welding divisions. He will continue to supervise quality control of welding electrode production at the Jersey City, N. J., and East Chicago, Ind., plants.

E. A. Leaverty, purchasing agent, has been promoted to general purchasing agent for Metal & Thermit, including the plants at Jersey City, Carteret and Piscataway, N. J., and East Chicago and South San Francisco. Mr. Leaverty will remain at the New York offices.

OBITUARIES . . .

John Pierpont Morgan, 75, chairman of the world-famous banking house, J. P. Morgan & Co., who died March 13, was known in the steel industry particularly for his long association with the United States Steel Corp., of which his father, J. Pierpont Morgan was one of the principal organizers.

Mr. Morgan was elected to the corporation's board of directors in 1909. He was chairman of the board five years, following the death of Judge Elbert H. Gary in 1927. For thirty-five years he was a regular attendant at the meetings of the directors and the finance committee. Since 1932 he was senior director.

For nearly 50 years he was a leader in the business and financial world. Succeeding his father, on the latter's death in 1913, he maintained its prestige as the world's largest banking house.

Irving S. Olds, chairman of the Steel corporation's board, last week paid this tribute: "Mr. Morgan was esteemed by countless friends and associates as a most able citizen of the highest character and integrity, possessing an admirable and charming personality. His great ability and vast experience were ever available for the benefit of the nation in time of peace and of war. His associates on the board of directors of the corporation who have known and loved him for years feel keenly the death of such an old and respected friend."

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Homer C. Bayliss, 58, for 20 years co-manager of the Detroit office of Motch & Merryweather Machinery Co., died in Detroit, March 14. He was active in the affairs of the American Society of Tool Engineers in Detroit.

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Max W. Babb, 69, since January, 1942, chairman of the board, Allis-Chalmers Mfg. Co., Milwaukee, died March 13, in that city. Born in Mount Pleasant, Iowa, in 1874, he was graduated from Iowa Wesleyan College in 1895, subsequently studying law at the University of Michigan, where he received his LL.B. in 1897. He joined Allis-Chalmers Co. in 1904, as its attorney, and had been with the company and its successor since that time. From 1913 to 1932 he was the sole vice president of the company and in 1932 became president. Mr. Babb was a director and member of the executive committee of Allis-Chalmers and also a director of Cutler-Hammer Inc.

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John G. Barry, 75, honorary vice president, General Electric Co., Schenectady, N. Y., died in that city, March 4. He had retired as senior vice president July 1, 1935, after more than 45 years' service.

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Ernest E. Wangelin, 73, president and founder, Century Brass Works, Belleville, Ill., died in that city, March 14.

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Richard De Wolfe Brixey, 62, president and treasurer, Kerite Insulated Wire & Cable Co., New York, died March 14, in that city. He had been associated with the company 40 years.

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Frank A. Ball, 84, chairman of the board and retired president, L. S. Starrett Co., Athol, Mass., died March 6, at Sarasota, Fla. Associated with the Starrett organization 45 years, he served as president from 1922 to 1940.

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Jacob Andrew Menges, 45, sales engineer for Motch & Merryweather Machinery Co. for 22 years, died Feb. 22, in Pittsburgh.

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Merrill N. Davis, 57, executive vice president, Dresser Mfg. Co., Bradford, Pa., died in that city, March 7.

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Edward J. Clark, 40, head of the safety department, Bethlehem Steel Co., shipbuilding yard, Mariners' Harbor, Staten Island, N. Y., died March 6, at Staten Island.

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John H. Jay, 53, president, Quick-Way Truck Shovel Co., Denver, died in that city, recently. At one time he was associated with Iowa Mfg. Co. and Iowa Steel & Iron Works, Cedar Rapids, Iowa.

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Harry J. Watling, 53, superintendent, West Pullman Works, International Harvester Co., Chicago, died at his home in Homewood, Ill., March 9. He had been associated with the company 25 years.

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James A. Heggie, 89, founder and retired president, James G. Heggie Mfg. Co., Joliet, Ill., died March 8, in that city.

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Elmer H. Van Schoick, 53, president, Chicago Retort & Fire Brick Co., Chicago, died at his home in Ottawa, Ill., March 13.

Unbalanced, Delayed Allotments Threaten Second Quarter Output

DETROIT

SERIOUSLY unbalanced materials allotments, split preference ratings, delayed allotments and inadequate forward allotments are going to make it difficult if not impossible to maintain authorized war production schedules during the second quarter, according to a survey of 256 plants in 27 states just made by the Materials Control Committee of the Automotive Council for War Production in Detroit.

Results of the survey have been forwarded to C. E. Wilson, executive vice chairman of the WPB, and a meeting was reported in progress in Washington last Thursday at which the critical situation was reviewed in detail by the WPB and industry representatives.

Summarizing the replies received in the telegraphic survey of 256 plants, 78 received no allotments, and of those receiving allotments, 86 were only partial, 53 were balanced, 23 were unbalanced and 16 unspecified. Out of the entire group, 87 reported split preference ratings and 19 of these were in the group reporting balanced allotments.

Need Major Adjustments Now

The immediate conclusions from this unsettled condition is that most plants will find it impossible, without major and quick adjustments in allotments and ratings, to complete present second quarter schedules. As an example of the effect of unbalanced allotments, a schedule for 1000 units which has been allotted 1000 units of alloy steel but only 380 units of aluminum will permit output of only 38 per cent of the desired schedule. Even worse it will promote receipt of unusable excess alloy steel to the extent of 62 per cent of the schedule.

Not only is it impossible for a manufacturer to build a schedule when allotments are out of balance, but it must be realized that according to CMP only one-third of the steel and copper and only 30 per cent of the aluminum allotted can be used during April, thereby necessitating reduction in schedules April 1.

It has been said that in some instances the purpose of fractional allotments was to force the use of existing inventories, but according to CMP existing inventories should have been taken into consideration in making applications and industry has distinctly understood no attempt would be made to adjust inventories by cutting allotments.

The materials group of the automobile industry emphasizes the difficulty of operations under split preference ratings, whereby the manufacturer is faced with a situation where he may be able to get most of his non-controlled materials and component parts with a lower preference rating, but cannot get all of them. Consequently it is sure to accumulate inventories of controlled and non-controlled materials which cannot be used because some of the component parts and non- it is impossible to obtain some of the component parts and non-controlled materials.

In addition there is a general complaint from many prime consumers and virtually all secondary consumers that they have not yet received all their allotments and that even now the time is too short to procure materials under CMP procedures for April and May. Despite the fact many allotments have not yet been issued, steel mills are now advising some customers that they must soon refuse further orders for second quarter because their capacity already is just about taken up by orders bearing allotment numbers. The effect of this situation on many important military production programs for which allotments have not yet been issued is held a matter of grave concern.

The industry is not entering a plea for discontinuance of CMP, but rather for modifications in three directions—realistic overall programming and scheduling by government to balance authorized war production output schedules with supplies of raw materials; concentration on objectives with resulting subordination and simplification of methods; and recognition of time-cycle realities of materials ordering. These are the same recommendations the industry made last fall when CMP was being developed. Current difficulties in materials allotments are charged to come from failure of government to do its part of the job.

Navy To Aid in Study Of Steel Foundry Sand

United States Navy has agreed to extend full co-operation to the American Foundrymen's Association in the latter's study of the properties of steel foundry sands at high temperatures. The Navy will act through the Naval Research Laboratory, of which Admiral A. H. Van Keuren is director and Commander R. W. Dole assistant director.

For the association this research project is under the direction of the Subcommittee on Physical Properties of Steel Foundry Sands at Elevated Temperatures, of which D. L. Parker, General Electric Co., Everett, Mass., is chairman. The research program is under way at Cornell University with J. R. Young in charge and with Dr. H. Ries, technical director of the association's Foundry Sand Research Committee as advisor.

At the Naval Research Laboratory the work has been placed under the direction of Howard F. Taylor, assisted by R. E. Morey and Charles Clemons. An exchange of visits is to be made between the personnel at Cornell University and the Naval Research Laboratory to lay a sound foundation for co-operative work and to avoid duplication of effort.

Central Aircraft Council Organized To Speed Output

In a move to step up production of aircraft and aircraft components, a Central Aircraft Council, with headquarters in Detroit and embracing leading aircraft manufacturing companies in the central states, has been organized with E. R. Breech, president of Bendix Aviation Corp., as chairman.

The new council will sponsor activities that parallel those of the West and East coast aircraft war production councils, but the organization will include manufacturers of engines, airframes and such components as propellers, carburetors, instruments, landing gear and other accessories. The council will be affiliated with the Automotive Council for War Production. Executive committee includes, in addition to Mr. Breech, H. E. Blythe, of Goodyear Aircraft; George T. Christopher, of Packard; M. I. Peale, Evansville, Ind., plant of Republic Aviation; E. B. Meissner, St. Louis Aircraft; A. T. Colwell, Thompson Products; O. E. Hunt, General Motors; Walter Wagner, Ford Motor Co. and C. E. Bleicher, Chrysler Corp.

One reason for organization of the new council was the need for having one point of contact with all manufacturers in the central procurement district on all common problems dealing with CMP procedure.

Hearings will be held in Washington before the Senate committee on small business March 30-31, and on critical and strategic materials on April 1.

WINDOWS of WASHINGTON

Using private enterprise to promote "full employment" suggests baleful results. . . Congress assuming postwar planning leadership because of dissatisfaction with NRPB's work

AS INDICATED in this department in recent weeks, the overall postwar economic planning of the Roosevelt administration, as sponsored by the National Resources Planning Board, provides much food for thought. Many of its features distinctly have merit. On the other hand, one of its fundamental concepts seems to be open to debate.

That is the concept that in the postwar period private enterprise will be the principal instrument in creating and maintaining full employment.

People who have invested money and time in going into business always have done so to earn a profit through producing and selling goods and services that other people wanted to buy—this at prices which other people could afford to pay. Employment has been the by-product; nobody probably ever entered business merely to give employment.

The planners all agree that private enterprise must be able to earn a profit—even a liberal profit—to stay in business. Thus it is the wording of this concept, rather than its details, that is open to question. This point is of great importance because we have had many unfortunate experiences in recent years as a consequence of tricky phraseology in many of our laws and government edicts.

Problem Is Unsolved

To say that private enterprise will be the principal factor in creating and maintaining full employment, seems to imply that labor's stake in the economy is basically the essential one. That might suggest that management would continue to be handicapped by many rigidities, leaving it with little to say about compensation or utilization of labor. In the past manufacturers have progressed and expanded their operations by improving their products, bringing down costs and making profits. A program of utilizing private enterprise mainly to promote full employment suggests some baleful possibilities.

Say, for example, that two companies manufacture electrical household refrigerators. Company A has a smoothly-functioning, efficient organization and can produce a product of attractive appearance and at a lower cost than Company B. Under a setup where the welfare of labor is the primary consideration, a number of different things might happen. Company B's employes might call for a floor under Company A's selling price in order to safeguard their jobs. Suppose that there were no "floor price," and Company A sold at approximately the same prices as Company B. In that event Company A would show a substantial profit at the end of the year under conditions of full employment and vast public purchasing power. Suppose the men—as they probably would do—requested a share of the profits over and above their regular wages and suppose that Company A. granted that request. It then would be only human for Company B's men to ask for the same measure of compensation.

A SPECIAL REPORT TO INDUSTRY

POSTWAR PLANNING

This is the ninth of a series of a detailed study of what is being thought about and accomplished toward making the postwar world a place in which the individual and industry may flourish.

That certainly would place Company B's management right behind the eight-ball, and might threaten its ability to furnish employment. On the other hand, in the event that Company B's ability to employ workers was protected by throwing a floor under Company A's prices, Company A would be hampered in its normal function of increasing employment through development of improved products and lower-cost methods of manufacture.

Therefore, while many businessmen who have studied the administration postwar economic plans are finding a great deal of merit in them, they would be much better pleased with them if the main emphasis were placed on devising a system under which private enterprise would be encouraged to expand as a result of profit incentives. Many of these businessmen fear that the idea of using private enterprise as the main instrument to furnish full employment is the sort of platform that would have wide appeal without insuring full understanding on the part of the general public as to the specific sort of treatment that must be accorded to private enterprise to enable it to fill that role.

There is another feature of the administration's plan that demands careful thought. That is the concept of utilizing government investment or spending to fill in the difference between national income created by private business and the amount of national income required to support full employment. This government investment program, as now set up, involves a tremendous schedule of public projects that would provite an enormous reservoir of work to be done.

Those who have criticized the program as including too much "blue sky" probably have not studied it as carefully as they might. Involving as it does revamping of living conditions in distressed communities, greater utilization of our potential water power, increased provision of flood control measures, fuller protection of our soil and so on, the program aims to do—on a larger scale in a more orderly way and at a more rapid pace—the things we have been doing gradually all these years to improve and preserve our heritage of the material things of life. It is in no sense an artificial program of mere work-relief such as the notorious "leaf-raking" projects which were all too prevalent during the early years of the last decade.

Control of Spending Important

One reason why this whole subject needs careful, critical consideration is because so much depends on who will have control of this government spending and how it will be controlled. We are justified in asking: Will the spigot be turned on or off, or part-way on or off, wisely and in the best interest of the country as a whole, or will the spigot be manipulated to a large extent on the basis of political considerations?

If, for example, a lot of government money were to be spent in the future to benefit certain elements at the expense of our overall economy, or to benefit certain areas in which votes are needed, or at the demands of labor unions, or the silver block, or any other pressure group or groups, the results obtained from government spending might tend toward unbalance.

It also seems fair to raise this question because so many businessmen who have had financial experience with the government have complained about treatment they have received. Many have believed that the question as to whether or

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not they looked all right politically to the eyes of this administration, had a lot to do with the manner in which they have fared. Even if this were not true under the present administration, there always is the possibility that it might be true under some future administration.

Naturally, the administration planners visualize a government spending system that will be administered wisely and fairly. However, under our form of government this hope cannot be guaranteed.

It must be remembered at all times that the plan now sponsored by the National Resources Planning Board still is only a paper plan. It remains to be seen what sort of a plan eventually is implemented by Congress. That Congress is not too favorably impressed with the plans of this board as they now stand, was reflected recently when it omitted an appropriation necessary to keep the board functioning after June 30. Whether the implied decision by Congress to take over the planning job in toto is a good or a bad thing cannot now be stated. The chances are that it is more good than bad.

Congress Acts Slowly

Unfortunately, a very considerable amount of "slow motion" thus far has characterized the postwar planning work of Congress, little more having been done than merely to plan for postwar planning. The only really concentrated Congressional attention that has been given to postwar planning was in the hearings of the House Committee on Labor in June and July of 1941. Everybody involved in those hearings seemed to think that Congressman Jerry Voorhis' bills calling for creation of a Post-Emergency Economic Advisory Commission and a National Unemployment Commission ought to be enacted into law. The chief stumbling block was lack of agreement as to how these bodies should be composed.

It was feared, for instance, that if the principal government departments were represented on these commissions, they probably would be able to exercise the same sort of domination they had exercised over the proceedings of the Temporary National Economic Committee. It was a case of well organized New Deal attorneys and economists keeping Congressmen in a state of befuddlement. All this was typical of the sort of experience that has brought about the present critical attitude of Congress towards bureaucracy.

Congressman Voorhis in January reintroduced his measure as H. J. Res. 36. This calls for establishment of a National Commission for Postwar Reconstruction. The proposed commission would consist of five members of the Senate, five members of the House, and twenty-nine associate members to be appointed by the President. Of these twenty-nine, three would be from the executive branch of the government; three from organizations of farmers; three from organizations of labor; three from organizations of business and industry (at least one from an organization representing small business); one from organizations of banks and financial institutions; three from church organizations; three from organizations of American war veterans (at least one of whom shall be a combat veteran of the second world war); two from educational institutions; two from organizations of consumers; three from co-operatives (one from a consumer co-operative and one from a credit union); one from public health and welfare associations; also one outstanding economist, and one outstanding industrial engineer. The commission would carry forward its work in whatever manner would, in the majority opinion of its members, achieve the best results. This commission would report directly to Congress.

REPRESENTATIVE JERRY VOORHIS
Proposes establishment of National Commission for Postwar Reconstruction

SENATOR WALTER F. GEORGE
Proposes establishment of a Committee on Postwar Economic Policy and Planning

Another bill that calls for postwar planning is that introduced in January by Congressman E. M. Dirksen of Illinois and identified as H. Con. Res. 2. This one calls for a Joint Committee on Planning and Reconstruction, to be composed of eleven members of the Senate and eleven members of the House. This committee would hold hearings and conduct studies with the assistance of paid advisors "to more effectively plan and prepare for the problems of demobilization, full employment after the termination of the present conflict, the reconversion of private industry, the maximum utilization of new industrial and agricultural processes and techniques, the cataloging of federal, state and local relief and work-relief projects, the evaluation of the usefulness and propriety of such projects, and the utilization of our national resources, and to better survey and supervise the appropriations and expenditures made in pursuance of such appropriations that are made by the Congress for the above purposes, and to more effectively carry out any plan, plans or programs of postwar reconstruction."

In January, Congressman Dirksen also introduced H. Con. Res. 3, which calls for the establishment of a Joint Committee on Peace Preparation. This Committee, which would concern itself with planning the terms of a "positive and realistic peace," would be composed of six representatives. It would be empowered to retain advisors on many subjects such as international banking, international law, aviation and raw materials.

R. R. 1898, introduced by Congressman Walter A. Lynch of New York in February, calls for an appropriation of $25,000,000 to be allocated by the President to various federal agencies to enable them to plan public works programs for execution after the war. It would also appropriate $75,000,000 to be allocated by the President to state and local agencies for the same purpose.

Senator Maloney Makes Proposal

S. Con. Res. 1, introduced in January by Senator Francis Maloney of Connecticut, would create a Joint Committee on War Problems to be composed of six senators and six members of the House. It would be the duty of this committee "to make a special study and investigation of the problems arising out of the war under existing and future acts of Congress, to confer with the President, and with the various departments and agencies of the government, from time to time, with respect to such problems; to consult with other committees of both branches of the Congress, and to report to the Congress from time to time, together with such recommendations with respect to legislation deemed advisable."

SENATOR CLAUDE PEPPER

Introduced legislation for a joint committee of five senators and five members of House to study postwar problems

SENATOR FRANCIS MALONEY

Urges creation of a Joint Committee on War Problems composed of six senators and six members of the House

REPRESENTATIVE WALTER LYNCH

Suggests $25,000,000 appropriation to be allocated to federal agencies to plan postwar public works

REPRESENTATIVE E. M. DIRKSEN

Seeks organization of Joint Committee on Planning and Reconstruction and a Joint Committee on Peace Preparation

S. Res. 22, introduced in January by Senator Claude Pepper of Florida, calls for a joint committee of five senators and five members of the House to "study, survey and investigate unemployment and relief problems, and cases of dislocation, and problems appearing in our economy, trade and fiscal affairs in the United States arising, or likely to arise, out of disturbed world conditions, the defense program, and the conditions attending the postwar period." It would make recommendations for legislation.

S. Res. 75, also introduced in January by Senator Pepper, would create a committee of nine senators to conduct the same sort of study.

S. Res. 102, introduced in February by Senator Walter F. George of Georgia, would establish a Committee on Postwar Economic Policy and Planning to be composed of ten members of the Senate. Its duties would be to "investigate all matters relating to postwar economic policy and problems; to gather information, plans and suggestions from informed sources with respect to such problems; to study the plans and suggestions received; to report to the Congress from time to time the results of findings made and conclusions reached." The aim is "a stable economy and a just peace." This bill early in March was favorably reported by the Senate Finance Committee and referred to the Committee on Audit and Control.

As this is being written, a group of senators are preparing a resolution paving the way for a United Nations organization for war and peace, to establish machinery for the settlement of international disputes and to create a world police force to guard against future aggression. The idea is to avoid repetition of the stormy debate over the peace that took place in the Senate after the last war. It is hoped that the policies to be followed will be shaped well ahead of time so that they can be used without delay when occasion arises. Indications are that this resolution may be one subject of considerable controversy in the Senate so that the outcome is not clear at this time.

This department in next week's issue will review the extent to which machinery for reconversion back to a peacetime already has been established and is functioning.

Postwar Planning Study Launched by C. of C.

Plans for studies on postwar readjustment problems by a special Committee on Economic Policy are being formulated by the Chamber of Commerce of the United States.

Program will be directed by Edgar V. O'Daniel, vice president, American Cyanamid Co., New York, chairman; J. Cameron Thomson, president, Northwest Bancorporation, Minneapolis, vice chairman; and Dr. Emerson P. Schmidt, University of Minnesota economist, secretary.

As part of the preliminary work, Dr. Schmidt has prepared the accompanying "balance sheet" of postwar assets and liabilities.

Assets

1. Reduction of private debt
   - a. Farm
   - b. Mortgage
   - c. Instalment Sales
   - d. Insurance loans
   - e. Open book accounts
2. Reduction of state and local debt
3. Accumulated private purchasing power
   - a. Savings banks
   - b. Insurance policies
   - c. Government bonds
   - d. Home ownership
4. Requirements for foreign rehabilitation*
   - a. Food and clothing
   - b. Animal feeds
   - c. Breeding stock
   - d. Machinery and equipment
5. Unemployment compensation benefit rights
6. Deferred demand*
   - a. Decrease in inventories—retail, wholesale, manufacturer and consumer
   - b. Consumer semi-durables—example: clothing
   - c. Consumer durables—example: housing and motor cars
   - d. Deferred maintenance of consumer and producer properties
   - e. Family formation
7. Technical shifts requiring new capital; example—development of plastics and light metals*
8. Prospect of avoiding extreme inflation
9. Growing public awareness of the "role" of business and industry in the economy
10. Trained labor supply and know-how
11. Public works to take up slack

Liabilities

1. Delay of reconversion to civilian production
   - a. Disposition of government contracts and supplies
   - b. Conversion a time-consuming process
   - c. Scarcity of raw materials
   - d. Equipment
   - e. Wait-and-see attitude due to new materials
2. Taxes and national debt
   - a. Effect on working capital of business
   - b. Costly task of reconversion
   - c. Taxes and cost-price relationship
3. International trade uncertainties
4. Problem of sustaining investment in a high-income economy
5. Absorption of total labor supply into production
   - a. Expanded labor supply*
   - b. Expectations raised by wartime wages
   - c. Plant and industry-wide collective bargaining assumes no responsibility for absorption of total labor supply
   - d. Effect of high wages on mechanization*
   - e. Payroll taxes on employer a tax on demand for labor
   - f. Annual increase in labor supply about 700,000 workers
   - g. Necessary investment per job
   - h. Cost-price relationship
6. Maladjustments in price structure
   - a. Wages
   - b. Farm prices
   - c. Other raw material prices
7. Government by blocs and pressure groups
8. Lack of unity as to future political and economic structure

*Some "assets" are in fact liabilities in terms of potential production; likewise, some "liabilities" are advantages. Here, however, we are concerned with solving a specific problem—reemployment and getting civilian production under way after the war.

Steel Production Under Complete Regulation by WPB Directives

STEEL production is now entirely controlled by the WPB Steel Division through directives issued to more than 200 companies, according to H. C. Batcheller, director.

These directives, developed last spring and first adopted on a limited scale in July, regulate production of integrated companies which melt their own steel and of nonintegrated companies buying steel from other producers for further conversion into steel products.

Directives list the tonnages of specified steel products to be manufactured each month, and are segregated by plant or district for the larger companies. They are based on determination of the WPB Requirements Committee and on war demand for each product as measured by the various product sections of the Steel Division with the help of claimant agencies.

Through this network of production directives, the steel industry has been geared to the production of the steel products which are needed to meet war and essential civilian requirements. Under CM, the production directives will assume even greater importance, since the total tonnage of steel allotted to the various claimant agencies will bear a direct relationship to the productive capacity of the industry.

Another objective of the system has been to assure the best possible use of nonintegrated companies' facilities. These companies—which number about two-thirds of all companies to whom production directives are issued—receive allocations of steel in definite quantities and forms from specified producers. The suppliers are carefully chosen with the object of securing satisfactory material, equitably distributing the load, and reducing long hauls of material wherever practicable.

Centralize Steel Products' Output

Another phase of the effort to attain fullest use of the industry's facilities has been reflected in the centering of the manufacture of certain steel products (demand for which is limited by war conditions) in fewer companies.

Administration of the system is handled by the Steel Division's production directive committee. The committee includes men who come to WPB from both integrated and nonintegrated steel companies and from organized labor. It meets regularly with representatives of various steel companies to discuss and formulate their production directives.

The Production Directive Committee now consists of Joseph L. Block, chairman, Charles Halcomb, Harold J. Ruttenberg, Jesse V. Honeycutt, Charles H. Longfield, Edward L. Parker, Carl Meyers, and R. W. Shannon, secretary.

WPB's Farm Equipment Section Reorganized

WPB's Farm Machinery and Equipment Division has been reorganized on a comprehensive scale. The new setup will have the advice and assistance of four new special consultants. They are:

Daniel C. Heithu, executive engineer, Harry Ferguson Inc., Dearborn, Mich.

Albert W. Lavers, chief engineer, minneapolis Moline Power Implement Co., Minneapolis.

Elmer McCormick, chief engineer, John Deere Tractor Co., Waterloo, Iowa.

David A. Willigan, agricultural and equipment engineer, Cleveland Tractor Co., Cleveland.

The reorganization places the following men in important positions:

W. Burr Downs, assistant director, formerly technical service manager, Allis Chalmers Mfg. Co., Milwaukee.

William F. Heesch, assistant director in charge of production, recently civilian chief of small arms production planning and control, Ordnance Department, U. S. Army, and formerly general manager, French & Hecht Co., Davenport, Iowa.

Mark K. Buttsfi, chief of Distribution Branch; formerly Eastern United States zone manager, Harry Ferguson Inc., Dearborn, Mich.; and previously with the J. I. Case Co., Columbus, O.

Ward B. Jenkins, chief of Program Branch; formerly head of the Agricultural Statistics Section, U. S. Department of the Census.

Charles D. Kinsman, chief of agricultural Research Section; formerly chief of research and statistics, artillery branch, Ordnance Department, U. S. Army.

Elmer G. Schaefer, chief of Controlled Materials Plan Section; formerly southern representative of H. D. Hudson Co., Chicago.

Based on its present production, Sloan Valve Co., Chicago, will save enough copper to make 70,500,000 thirty-caliber cartridge cases or 25,000 miles of No. 12 telephone wire by substituting for copper various plastics and malleable iron in the manufacture of its toilet flush valves, it is reported. Redesigning reduced net copper content from about 6 pounds to less than 4 ounces a unit.

U. S. STEEL OUTPUT AMAZES INDIAN INDUSTRIALIST

AMAZED at the tonnage output of United States steel mills was K. C. Mahindra, India Supply Mission, on a recent visit to the Gary plants of Carnegie-Illinois Steel Corp. Mr. Mahindra, left above, is a director in the Tata Iron & Steel Co. and the Bengal Steel Corp. He is shown above with Capt. John Cavanaugh, Chicago Ordnance district, and Steelworker Edwin Hering

CMP Manual Assists Consumers in Establishing Materials Record

DISTRIBUTION Bureau, Controller Division, WPB, has isued an accounting manual to assist manufacturers in organizing their record-keeping and accounting under the Controlled Materials Plan.

Use of the form suggested in the "Controlled Materials Plan Consumer Allotment Accounting Manual" is not mandatory. Other types of records showing the same information will be acceptable.

The card illustrated provides space in the heading for the Claimant Agency symbol and major program number, the controlled material item, unit of measure, and the calendar quarter. The body of the card has columns for recording date of entry, description of the item or reference, quantities received on allotments, quantities reallotted, quantities purchased, and the unused allotment balance. The form suggested in the Manual and reproduced on this page is designed for a 5- by 8-inch card and has columns for recording quarterly allotments.

Allotments received will provide the basis for the first entry on the allotment card. Allotments will be made on forms CMP-4A, CMP-4B, CMP-4C, CMP-5, or such other forms as may be authorized. The quantities of controlled materials allotted to the consumer on any CMP-4 form or CMP-5 will be entered on the allotment cards, establishing the balance available for purchase or distribution to other consumers.

As soon as the quantities to be subdivided have been determined, the appropriate allotments are made on either CMP-4 or CMP-5 forms. The quantities extended or passed on the secondary consumers are posted to the proper allotment cards, in the "Reallotted to Other Consumers" column, reducing the balance. It is assumed that a consumer will make allotments for all of the quarters for which allotments are received. It would facilitate posting allotment extensions if the allotment cards covering all of the controlled materials contained in a single allotment number are held in a group.

CMP Regulation No. 1 provides a special procedure for consumers purchasing Class A products containing small quantities of controlled materials without making an allotment. A person requiring any Class A product in which the quantity of controlled material constitutes a "small order" may, in lieu of making an allotment, place on his order the applicable allotment number followed by the symbol "SO." A manufacturer of Class A products receiving a small order is not required to furnish a bill of materials or to file an application for allotment. All orders received in accordance with this provision may be grouped under the symbol "SO" by the manufacturer making the product.

To minimize the amount of work in accounting for allotments received, a consumer purchasing Class A products requiring small amounts of controlled material is not required to record the quantities of controlled materials contained in small orders. In placing a small order for Class A products the exact quantities of controlled materials involved are not stated on the purchase order, and no charge is made by the buyer to his allotment accounts.

Estimate for Small Orders

As soon as a substantial number of such small orders have been received, the consumer should estimate the quantities of controlled materials necessary to produce the number of Class A products for which small orders have been received. The quantities so estimated would then be posted to allotment cards as an allotment received. The symbol "SO" would be written on the allotment card instead of the Claimant Agency symbol and major program number.

One or more allotment identification will appear on all purchase and delivery orders. In addition to allotment identifications for major programs of Claimant Agencies and small orders, consumers will place orders for controlled materials to be used as maintenance, repair and operating supplies, identified by the symbol "MRO."

The quantities shown opposite the allotment identifications are posted to the allotment cards in the "Orders Placed" column, reducing the balance. The purchase or delivery order number or the name of the supplier should be entered in the reference column. The quantities opposite the symbol "MRO" are posted to a separate allotment card for each controlled material, in order to furnish a complete record of all controlled materials ordered for use as maintenance, repair, and operating supplies. Quantities specified in orders placed for controlled materials to fill small orders received are posted to the "SO" allotment cards.

CMP Regulation No. 1 provides that every allotment made by a consumer must be accompanied by the "controlled materials required to fulfill the schedule" except in the case of orders coming within the "small order" provision. Consumers will not be required to maintain specific records of the production obtained from each allotment received. When a consumer makes delivery of the number of units called for in the authorized production schedule, it is not required that he account for the use of the specific allotment received.

If a producer is unable to fill any order for a controlled material, the consumer will be notified and will make the appropriate entry on his allotment records by reversing the entry made when the order was placed originally. When the order rejected is placed with another producer, it is recorded in the same manner as any other order placed.

ALLOTMENT IDENTIFICATION	CONTROLLED MATERIAL						UNIT OF MEASURE			SECOND QUARTER 1943 16		
DATE OF ENTRY	REFERENCE	ALLOTMENTS RECEIVED			ALLOTMENTS USED						ALLOTMENT BALANCE		
					REALLOTTED TO OTHER CONSUMERS			ORDERS PLACED					
SAMPLE ALLOTMENT CARD													

Form of card which may be used in accounting for allotments received under Controlled Materials Plan, as outlined by War Production Board

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, Dec. 14, 1942

L ORDERS

L-83 (Amendment): **Industrial Equipment,** effective March 12. Explicitly permits the lessor of certain types of industrial equipment, including can-making and closing machinery, leather working, shoe, textile manufacturing machines, to recover his machinery from the lessee on termination of the lease.

L-264: Rectifier Tubes, effective March 10. Provides control over production, distribution and sale of rectifier tubes. Manufacturers must submit quarterly statements of proposed production and delivery schedules for the ensuing three months. Limits manufacture of screw-bases to the use of iron and steel with the exception of copper, copper base alloys, and zinc in protective coatings or in fulfillment of military exemption orders. Brass may be used only in eyelets and pins.

L-269: Mining Equipment, effective March 11. Prohibits use of rubber, aluminum, copper, zinc or alloy steels, except in bearings, electrical conductors or parts subject to high stress, shock, abrasion, wear or corrosion, in the manufacture of any item of mining equipment or repair parts. Manufacturers must file by March 25 and by the 15th of each succeeding month on form PD-815 a schedule of proposed production and deliveries and a report of the previous month's shipments and orders.

M ORDERS

M-1-i (Amendment): **Aluminum,** effective March 31. Authorizes companies receiving Controlled Materials Plan allotments of aluminum to use the metal for a specified group of end-products. Requires companies to have special authorization in addition to the receipt of an allotment to use aluminum for any other purpose. High grade aluminum may be used, without application for permission, only for certain specific purposes, including combat end-products, aircraft, and alloys with other metals. In a separate list of items, only low-grade aluminum may be used. Further use of low grade aluminum is permitted only for items on this list and in items for which high grade is permitted.

M-104 (Amendment): **Closures for Glass Containers,** effective March 15. Removes all quota restrictions on manufacture of certain types of metal lids used to seal jars. Maintains ban on use of zinc. Releases more metal for closures used in bottling fluid milk.

M-212 (Amendment): **Petroleum Coke,** effective March 15. Permits products (in which use of petroleum coke is allowed) to be packed in coke while baking. Removes controls applicable to exports of petroleum coke to Canada. Application for permission to use petroleum coke for purposes other than those specifically outlined in the order must be made by letter filed with the Aluminum and Magnesium Division.

M-292: Coal and Coke, effective March 12. Provides means by which coke made from bituminous coal can be allocated, if such action becomes necessary. Requires producers to file monthly production, distribution and inventory reports with the Bureau of Mines on forms BE and BY of the Bureau.

M-302: Osmium, effective March 16. Prohibits use of osmium for all purposes except the manufacture of alloys for electrical contacts. No person is permitted to put into process any osmium, excepting osmium alloys, for any other purpose than the one named in the order. "Osmium alloy" is defined to mean any alloy containing 0.5 per cent or more of osmium metal by weight. All other materials containing the element are considered to be osmium within the meaning of the order.

U ORDERS

U-1-d: Utilities, effective March 10. Grants advance approval of limited utility connections for construction or remodeling projects permitted under L-41. To qualify for such automatic approval, material for an electric, gas or water connection must cost less than $1500 in case of underground connection or $500 in case of other connections. Limits use of copper to 60 pounds in an electrical connection or 250 pounds of iron and steel for gas or water service for an industrial or commercial consumer; restricts use of material for domestic consumer projects to limits established by the Housing Utility Standards issued by WPB.

PRIORITIES REGULATIONS

No. 3 (Amendment), issued March 9. Simplifies application of preference ratings to telegraphic orders for scarce materials by permitting use of phrase "rating certified" in place of previous ten-word form. Requires that only a written description of the materials purchased be sent by the buyer to the supplier within fifteen days following placement of an order by telephone. Permits immediate extension of a preference rating assigned in the course of a telephone order, if necessary for the supplier to acquire the material to be delivered. It cannot be extended to replenish inventory until receipt of written confirmation. Eliminates provision which previously prohibited any further deliveries to a person who had applied a rating in the course of a telephone order but who failed to follow with a written confirmation within a specified period.

CMP REGULATIONS

No. 8—Production Requirements of Controlled Materials Producers, effective March 13. Provides rating of AA-1 and an allotment symbol, X-1, which may be applied to purchase orders for other than controlled materials by those controlled materials producers who apply for and receive specific authorization to operate under the regulation's terms. Applications for controlled materials item are to be made on Form CMP-4B addressed to the Controlled Materials Division. In the case of aluminum required for certain listed purposes, form CMP-13 is to be used in making the application which should be addressed to the Aluminum and Magnesium Division. When controlled material required is made of the same basic metal as that produced by the applicant, requirements will be filled only by directives issued according to terms of CMP Regulation No. 1. Prohibits any consumer of controlled materials from including in any bill of materials or application for allotment requirements for controlled materials needed for manufacture of the controlled material to be included in his product.

PRICE REGULATIONS

General Maximum Price Regulation (Order No. 325, issued March 13.) Provides producers of nonferrous mill products who cannot establish ceiling prices under the Regulation with a procedure they may use instead of applying to Washington. A manufacturer may determine his maximum price for new products by using the formula or pricing method used in March, 1942, for comparable products, employing cost rates of March, 1942, except that current metal costs shall be substituted for those of March, 1942. Covers following products: rough and machined, made by rolling, drawing, stamping, forging or extrusion. Excludes those products sold by a person who only machines them, and finished parts and sub-assemblies. Does not cover castings, rolled zinc products, lead bullet rod. Revokes order No. 35 under section 3 (b) of the General Maximum Price Regulation because brass mill products which it covered are included in the new order.

No. 3: Zinc Scrap and Secondary Slab Zinc, effective March 18. Provides that secondary slab zinc that fails to meet specifications for prime western grade must be sold below the maximum price for that grade. Places less-than-carload lots of secondary slab zinc under new pricing formula which equalizes prices for carload and less-than-carload lots except for graduated quantity premiums. Eliminates record-keeping provisions of former Revised Prices Schedule No. 3 except in transactions involving industrial consumers. Permits deduction of the weight of foreign material "according to the established practice of the trade." Regulates toll and conversion charges. Rules that lowest carload rate between the same two points must be used in calculating charges. Prohibits the breaking up of an order for the purpose of obtaining higher quantity premiums.

No. 12 (Amendment): **Brass Mill Scrap,** effective March 22. Modifies definition of brass mill scrap to provide that material unsuitable for brass mill use is not to be considered "brass mill scrap". Such material is placed automatically under control of price regulation No. 20.

No. 20: Copper Scrap and Copper Alloy Scrap, effective March 22. Replaces revised price schedule No. 20, as amended. Brings under specific prices the entire field of copper scrap and copper alloy scrap by establishing specifications and cents-per-pound prices for 16 new grades of material. Provides that any grades that do not meet any of the specifications for listed grades other than refinery brass must be sold as "refinery brass." Allows quantity premium of 0.75 cent per pound for shipment of 60,000 pounds of one group number and an additional 0.50 cent per pound for a minimum of 20,000 pounds of one other group number when shipped together in one car. Maximum prices for the new grades established in the order on the basis of f.o.b. point of shipment in cents per pound are as follow: copper borings, 9.75; copper tuyeres, 8.75; tinny bronze borings, 10.50; copper-nickel solids and borings, 9.25; aluminum bronze solids, 9.00; contaminated gilding metal turnings, 8.50; mixed brass screens, 7.75; old nickel silver solids and borings, 6.25; copper-lead borings, 6.25; and zincy bronze borings, 8.00. Maximum prices vary with analysis of high grade low lead bronze borings, soft red brass borings, manganese bronze solids, and manganese bronze borings. For purposes of classifying turnings and borings, the button analysis shall govern; for pricing purposes, the wet or natural analysis should govern. Eliminates reduction in price for No. 2 copper wire and mixed heavy copper and for light copper when bought by inspection instead of by analysis. Revises formula and method for pricing high-lead bronze and changes specifications for both high-lead bronze and high-lead bronze borings which reduce the price ½-cent per pound. Reduces maximum price of cocks and faucets from 8.00c to 7.75c per pound. Transfers No. 1 tinned copper wire from Group 2 to Group 1. Requires that a deduction be made for the cost of removing the covering from lead-covered copper wire and cable similar to that applicable to insulated copper. Allows a special preparation premium of 2.50 cents per pound for putting manganese bronze solids into crucible shape. Broadens specification of soft red brass borings to keep material with valuable tin content from being classified as refinery brass. Provides for a deposit charge of $1.00 for steel drums when delivery is made by a carrier other than a public carrier. Permits small ingot makers to apply for authority to pay the crucible shape premium as well as to apply for permission to pay the briquetting

premiums. Contracts made prior to March 22 under provisions of Revised Price Schedule No. 20, as amended, may be carried out until April 12.

No. 43 (Amendment): Used Steel Drums, Pails and Containers, effective March 18. Establishes specific maximum prices for 5½-gallon used steel pails at 57.00c delivered, subject to deductions specified in Appendix B of the schedule, when reconditioned; 25.00c with cover, 12.00c without cover, and 6.00c for cover alone in their "raw" condition and before reconditioning. Sets maximum prices for used steel containers of 22 U. S. Standard gauge or lighter, of any capacity that are suitable for reuse with or without reconditioning and that are bought by a filler directly from the person who empties the container at 15.00c for used containers of 20-gallon capacity or less, and 25.00c for those with more than 20-gallon capacity. The prices are f.o.b. the place at which they are emptied.

No. 188 (Amendment): Manufacturers' Prices, effective March 11. Authorizes method for granting price relief for specified manufacturers in a limited number of hardship cases. Following conditions must be met: Manufacturers must be sole producer of an essential article; costs must exceed present ceilings; and company must be operating at a loss.

No. 342: Nail Keg Staves and Headings, effective March 18. Establishes maximum prices for nail keg staves and headings. Allows for staves same average margin over costs as existed in 1941, that is 15 cents per bundle, which brings the selling price of 17-inch staves to $1.05 per bundle. Prices for staves of other lengths are specifically set at $1.00 per bundle for 15-inch, $1.08 for 18-inch, $1.13 for 19-inch, and $1.20 for 21-inch lengths. Provides formula for computing prices for staves and headings not specifically listed in the regulation. Sets following maximum prices for headings: $60.00 per thousand sets for diameters of 9¼ inches, $63.00 for 10¼ inches, $67.00 for 11¼ inches, $72.00 for 12 inches. All prices listed in the regulation are f.o.b. mill. Actual transportation paid or incurred by the seller in making shipments directly from the mill to the point of delivery may be added to the ceilings to compute maximum delivered prices.

No. 251 (Amendment): Construction of Buildings, effective retroactively to Oct. 30, 1942. Exempts from price control following two types of construction contracts with Defense Plant Corp.: (1) cost-plus-a-fixed-fee prime contracts and subcontracts; (2) contracts performed on the basis of costs only with no addition for profit. In the case of each excluded contract, the Defense Plant Corp. must certify to OPA and the contractor or subcontractor that the contract or subcontract has been negotiated in accordance with the plan filed with OPA.

Simplified CMP Form for Class A Products Offered

Manufacturers of items identified as Class A products under the Controlled Materials Plan may now apply for their allotments of aluminum, copper, and steel on one of the simplest government forms ever devised.

Form CMP-4A, formerly a four-page sheet, has been revised to provide a single, letter-size page, on the reverse of which are printed instructions for filling out the streamlined application. What a manufacturer makes, how much controlled material he needs, and when he wants it delivered is all the information required of him. When the answers to the two latter questions have been determined, the actual filling out of the new CMP-4A will take only a matter of minutes.

Revised form, which has been mailed to industry for use in connection with materials to be delivered during and after the third calendar quarter of this year, is in line with WPB's announced policy of simplifying CMP procedure wherever possible without endangering the orderly flow of vital materials. A similarly simplified form of CMP-4B will be available soon.

Coke Producers Required To File Monthly Reports

An order under which coke made from bituminous coal can be allocated, if such action should become necessary, has been issued by WPB.

The order, M-292, requires producers to file monthly production, distribution, and inventory reports with the Bureau of Mines on forms BE or BY of the bureau. These forms have been filed voluntarily by producers for the past year.

Blast furnaces producing pig iron consume about 80 per cent of all coke produced in this country. The balance is consumed in the manufacture of water gas and producer gas, for domestic heating, for foundries, and for other industrial purposes.

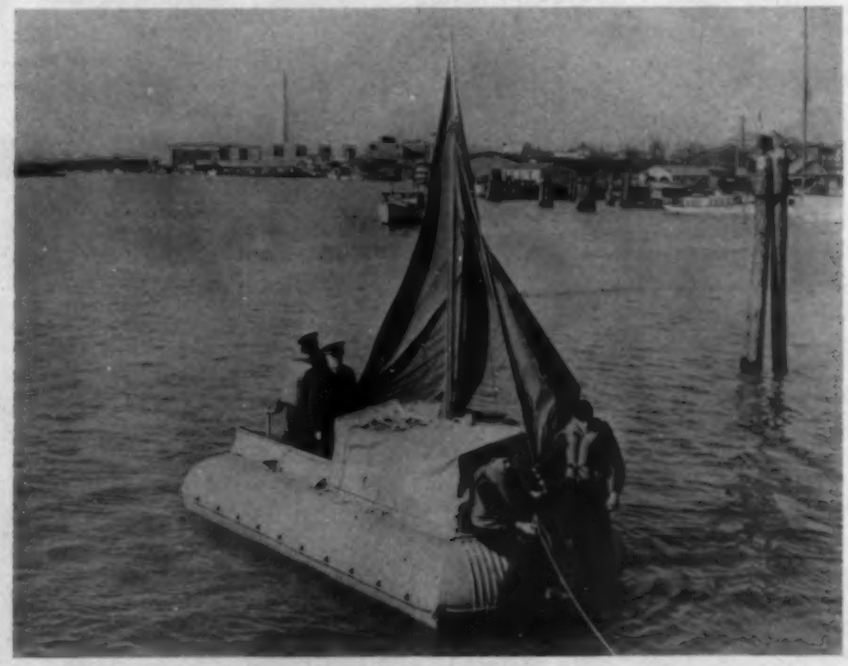
The Office of Solid Fuels Co-ordinator reports that there is no shortage of bituminous coal. However, since coke production is limited by the total coke plant capacity, it is estimated that the coke supply will be slightly below requirements for both 1943 and 1944. It was therefore considered advisable to provide the means of allocation control established by the new order.

Automotive Replacements Parts Control Amended by War Board

New methods of controlling production of automotive replacement parts to fit it in with the Controlled Materials Plan have been established with the issuance of amended limitation order L-158.

Amended order provides no producer shall manufacture and purchase at a rate which will make the dollar cost value of his finished replacement parts inventory greater at the end of any quarter of 1943 than it was on April 1, 1943. The producer is allowed a 60-day period following the end of each quarter within which he may increase or decrease production to bring his inventory to the level of April 1, 1943. This provision removes the percentage restriction on production, thereby increasing the amount of replacement parts that may be manufactured.

STEEL LIFE RAFT APPROVED BY COAST GUARD



NEW steel life raft is demonstrated on the Potomac river in Washington. Approved by the United States Coast Guard, the steel rescue vessel may become standard equipment on merchant ships sailing into the war zones. It is designed to carry 20 men and is claimed to offer more safety and comfort than the life rafts now in use. NEA photo

FREE TELL-ALL BOOKLETS...
For SHEET-STEEL FABRICATORS

Many war products are being redesigned with sheet steels to conserve even more critical metals. Thousands of new men swarming into America's war industries need helpful, up-to-the-minute information.

To you men of new responsibilities, ARMCO offers informative booklets on coated and uncoated sheet metals. We want to help you turn out more and better war equipment. And we want you to remember these ARMCO *special-purpose* metals when you turn from war to peace-time products.

The free booklets described are offered only to men who work or intend to work with flat-rolled iron and steel and stainless steels. Please write on your company letterhead, naming the booklet or booklets you want. The American Rolling Mill Company, 591 Curtis Street, Middletown, Ohio.

STAINLESS STEEL FABRICATING

The booklet "How to Fabricate ARMCO Stainless Steels" is complete in every way. Contains fabricating data on cutting, drawing, annealing, welding, soldering, riveting, finishing and design. Also compares the physical properties of various metals.

PAINTABLE GALVANIZED SHEETS

Tells about the *original* galvanized bonderized sheet metal that takes and preserves paint. Reveals results of tests and describes in detail the recommended fabricating and finishing practices. There are special sections on welding.

PORCELAIN ENAMEL

Describes this non-critical finish for wartime applications. The booklet gives useful engineering data on porcelain enamel, explains physical properties, and tells about the job-enameling plants in the industry.

HIGHLY REFINED IRON

"Where to Use ARMCO Ingot Iron . . . and Why." This highly-refined, durable iron is described in a 20-page booklet. Sets forth service records, explains the various grades and explains working of sheets and plates.

CHROMIUM-NICKEL STAINLESS

A 24-page booklet that interprets the uses and characteristics of the Chromium-Nickel grades of ARMCO Stainless. Includes corrosion resistance data of all kinds and tells average physical properties of each grade.

SPECIAL—FOR PIPE USERS

ARMCO Spiral Welded Pipe for industrial uses. Embraces complete data tables (including pressures) and tells how to save with prefabricated fittings that eliminate unnecessary joints. Contains flow charts.

WORKABLE ZINC-COATED SHEETS

"Useful facts about ARMCO ZINCGRIP," a zinc-coated iron or steel that does not peel or flake when severely formed. Chock-full of valuable fabricating tips on deep drawing, roll and brake forming, welding, recoating joints, soldering and finishing.

★ ★ SPECIAL PURPOSE ARMCO SHEET METALS ★ ★

THE AMERICAN ROLLING MILL COMPANY

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Leases four buildings of Hupp Motor plant to handle assembly of tank treads and tracks. . . No extrusion molding process facilitates forming rubber sections. . . Tank drive units in mass production

DETROIT

LIGHT and medium combat tanks are the "automobiles" of 1943, and a large section of Detroit industry is busily engaged either in assembling the combat vehicles or in supplying parts for them. It was perhaps with pardonable pride that several business paper editors from Detroit watched a parade of tanks, tank destroyers and weapon carriers at a recent demonstration at the Aberdeen Proving Ground of the Ordnance Department, for they recognized the leading role which motordom is playing in this huge program.

One of the most vital parts of tank construction is the track and tread mechanism. To handle increasing demands for this equipment, the United States Rubber Co. has announced the leasing of four buildings and the power house of the Hupp Motor Car Co. in Detroit, where production is already under way while new equipment and conveyor systems still are being installed. Principal operations include the assembly of treads and hooking them up into the track chain.

Two types of treads, each with certain advantages, are being supplied by U. S. Rubber. The rubber tread or track block is one, and it has made possible the high degree of maneuverability demanded in modern tank warfare. Tanks with this type of tread can move faster, encounterless wear on moving parts than is the case with steel treads, and of course are less destructive to roads on which they operate.

However, conservation has dictated the inclusion of steel treads on a part of tank production, and this program is moving ahead steadily. Several different designs of steel treads are in use.

In connection with the tank tread work, U. S. Rubber has introduced a new process for molding rubber. Instead of heating the rubber in steel molds, a new machine injects the material into forms through a small hole under high pressure. The temperature of the rubber thus is raised almost to the vulcanization point and little additional heat is required.

Besides effecting a saving in original equipment and operational cost, the new process is claimed to afford a better cure. The rubber is heated uniformly throughout rather than from the outside as formerly. Another advantage is that it is vulcanized under greater pressure, which makes the finished article more compact.

Several new types of presses, designed here, are now in operation at U. S. Rubber plants producing tank tread parts by the injection method. The process has been demonstrated within the rubber industry in order that its principle may be used in other war production.

Hupmobile was once a great name in the motor industry but it has been in eclipse for the last seven or eight years. The plant has been operated to some extent doing contract war production jobs, but much of the machinery has been transferred and sold. The company was incorporated in 1908 with a capital of only $2500, and from this inauspicious beginning a business was developed which eventually sold better than $600,000,000 worth of cars. The buildings now occupied by U. S. Rubber were erected in 1920-23.

WRISTLET FOR HITLER! A workman tightens section of tank track and tread assembly in one of the buildings acquired from Hupp Motor Co. in Detroit by United States Rubber Co. The latter company required additional space to handle increasing tank track production

Spare Tank Tracks Provided

Importance of assuring an adequate supply of tank treads and tracks can be appreciated from the fact that 100 per cent spares are supplied as original equipment, and additional replacement supplies are ordered as needed. Under some conditions of service, treads wear exceptionally fast, whether of rubber or steel; and in addition there must be considered attrition losses in combat.

Buick has been supplying power trains for medium tanks for several months now and has just released a few details of the work which occupies several plants at Flint. The power train is the final drive and transmission assembly and consists of five major components—transmission and differential gears, differential housing, differential carrier, or axle, and final drive housing and transmission housing. All are assembled as a unit in a large housing of cast armor plate, and provide for transmission of power from the tank engine to the two forward driving sprockets of the tank.

As might be imagined, the manufacture of these transmission bruisers required extra large and rugged machine equipment, convenient methods of handling the heavy pieces, and advanced fixture development to permit holding the pieces simply yet firmly and entirely accurately

Large stocks of tank treads, which casual inspection reveals to be cast steel, awaiting assembly into tracks at plant of Hupp Motor Co. in Detroit leased by United States Rubber Co. to handle stepped-up program for supplying steel and rubber tracks for combat tanks

as the work progresses through machining and assembly operations.

Notwithstanding the specialized character of the work, about one-fourth of the machines currently used at Buick were converted from former automotive uses. Within the limitations of the bulk of both the finish power train and its components, engineers laid out the manufacturing processes to provide a line flow of production. Transmission and differential gears are manufactured and assembled like their automotive prototypes, with machining at similar precision limits, despite the size of the pieces. Gear assemblies are produced in a former engine and axle plant.

At every point in the process, the ease with which pieces mount onto fixtures is noteworthy. In production of the various housing elements, electric chain hoists lower the rough castings onto tapered guides, down which they progress to the final position in the fixture. By tapering the guides, alignment is accomplished readily by letting the heavy pieces lower slowly into place.

Three drive housings are mounted on a 7-ton fixture for roughing and finishing end faces in this milling machine which has a 36-foot bed

As an example of the accuracy of machining, locating pads for subsequent operations on the differential housing, which weighs several thousand pounds, are finished within limits of 0.001-inch, while the transmission case, a heavy cast unit, is machined throughout within limits of 0.001.

In the evolution of the preliminary experimental setup to volume production, a number of shortcuts were developed by means of specialized machines. In one instance, a multiple three-way drilling machine simultaneously drills the required holes in the differential housing in a matter of minutes, where originally the work was done on a single-spindle drill and took the better part of a full three-shift day.

In one of the most spectacular jobs of the entire process, three large housings are fed "in a gang" through a special horizontal eight-spindle milling machine which roughs and finishes the end faces of all three in one operation. This machine operates over a 36-foot bed, and the fixture to hold the parts alone weighs almost 7 tons.

Power Train Tested

Final assembly of the power train starts with the installation of gears in the transmission cases. Meanwhile, the final drive assembly is being joined together and gears installed in the carrier. After this installation, the transmission case assembly is united with the final drive assembly and the entire unit assembled into the differential housing. Following final assembly, the power train proceeds to a test stand and then to a paint booth. After painting, sprockets and hub are attached, and the unit is shipped to the tank arsenal.

Unusual service is being offered to manufacturers of ordnance parts and other units who have to cope with rigid government requirements on finish and tolerance and who may not have facilities for measuring such factors. Mid-West Abrasive Co. is offering, free, engineering and laboratory service to such contractors.

The laboratory, located at the company's plant here, is equipped to measure accurately depth of scratch down to one-tenth of a microinch (0.0000001-inch), or to determine promptly whether or not any given part is optically flat. And in the event the part is found to be deficient in this respect, the laboratory will process it if the user of the service so requests. No charge is made for this work.

Questioned as to how it is possible to offer such service gratis, when normally

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TENUAL

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MAKERS OF QUALITY SAND AND PERMANENT MOLD ALUMINUM CASTINGS

Up and away, as an overhead crane moves the heavy tank transmission and final drive assembly from one operation to the next

an appreciable fee might be expected, L. P. Jackson, vice president in charge of engineering for Mid-West, said the company had the profilometer equipment available and an experienced operator to handle it, so it was figured that if help could be provided in measuring certain parts carrying such minute tolerances or finish, it would be worthwhile to offer. The service includes return of the part submitted along with readings and complete technical data on the grain, grade, tool speed, coolant and pressure recommended to produce the required finish. Prospective users of the service are asked merely to submit a sample part and identify the metal therein.

First meeting of the new manpower utilization committee of the Automotive Council for War Production was held March 12 and the 18 industry leaders (STEEL, March 15 p. 59) heard a detailed report of Great Britain's experiences in dealing with manpower problems in wartime from N. F. Stockbridge, managing director of the AC Sphinx Sparking Plug Co. Ltd.

After discussion of manpower problems in general, the committee agreed it needed more facts about labor requirements, absenteeism and labor turnover. It also authorized the appointment of subcommittees to deal with worker supply, efficient manpower utilization, and worker morale. Because of the importance of available materials supply on plant working schedules, the group also decided to set up a materials planning and scheduling committee to study the situation as it affects continuity of employment and worker morale.

In opening the committee meeting, C. E. Wilson, chairman, observed that automotive plants are now delivering weapons of war to the armed forces at a rate approaching $1,000,000 an hour.

Prof. James M. Church of Columbia University says his chemical engineering laboratories, working in conjunction with plastic manufacturers and airplane producers, have come up with a new plastic, called Thermo-Cast, resembling red sealing wax, which can be melted at 200 degrees Cent. and cast into suitable shape for use as forming blocks and dies, to fabricate aircraft shapes. With an ethyl cellulose base, the material includes resins, pigments and plasticizers which are claimed to produce high impact strength, hardness, low compressibility and durability. The Professor thinks the new plastic is so good that it will "increase airplane production by 50 per cent."

Pouring Device Developed By Delco-Remy Engineers

In connection with an illustration appearing on page 70 of the Feb. 22 issue of STEEL, showing a pouring device used at Packard Motor Car Co., Detroit, to meter molten aluminum from reverberatory furnace to pig molds, it should have been pointed out that this development was originated by B. A. Dollens, general superintendent of nonferrous foundries, Delco-Remy Division, General Motors Corp., Anderson, Ind. The device proved so successful that it was made available by Mr. Dollens to others in the industry and is now in use. STEEL regrets the omission of this fact from its original descriptive material.

Cold-Drawn Open-Hearth Steel for Bullet Cores

American Steel & Wire Co. has developed a cold-drawn open-hearth steel bar which it reports has proved suitable for use in the core of machine gun ammunition. Former specifications called for electric furnace steel bars, centerless ground, capacity for production of which was limited by lack of centerless grinders.

Use of the new product permits production of bullet cores, requirements for which had grown beyond capacity of electric furnaces to produce. By its use more electric furnace steel is released for other purposes and necessity for building more centerless grinders is eliminated.

Although the process has necessitated introduction of many revolutionary practices a minimum of new equipment was required. As a result of the new material mills are producing quantities never equalled anywhere at any time.

2850 Miles of Access Roads Scheduled for Construction

To satisfy needs of America's war industries for raw materials, more than 2850 miles of access roads to mines, quarries, and forests have been scheduled for construction.

By March 1, roads of this type had been approved for construction to cost about $9,000,000. A hundred miles of such roads were completed in 1942 at a cost of $346,000. These access roads to sources of raw materials are exclusive of the access roads to military establishments and industrial plants.

Most of the access roads are shaped with a bulldozer and surfaced with gravel at relatively small expense.

Deposits of 28 different minerals, metals, and rare elements are tapped by these roads at about 225 locations in 22 states and Alaska. The access road in Alaska, 9½ miles long and costing $93,500, gives access to a chrome mine.

Salvage of copper, tin and nickel in Belgium is more compulsory than voluntary, according to a report to the Department of Commerce. Quotas on the basis of income are established for individuals and those failing to contribute their share are assessed a cash penalty in excess of the value of the required metals.

Orders for Specified Products Exempted from Renegotiation

JOINT regulation defining exemption of certain types of war contracts and subcontracts from renegotiation has been issued by the procurement agencies.

Exempted products include the following: Aggregates consisting of washed or screened sand, gravel or crushed stone.

Aluminum ingots and pigs; alumina; calcined or dried bauxite; crude bauxite.

Antimony ore, crude; antimony ore, concentrated; antimony metal; antimony oxide.

Arsenic powders; arsenious oxide (white arsenic).

Chromium ore and ferrochrome not processed beyond the form or state suitable for use as an alloy or refractory in the manufacture of steel; bichromates; chromic acid.

China clay; kaolin clay; fire clay; brick and tile made from clays other than kaolin, china or fire clay.

Coal, prepared; run of mine coal.

Copper ore, crude; copper ore, concentrated; copper billets, cathodes, cakes, ingots, ingot bars, powder, slabs and wirebars.

Fluorspar ore; fluorspar fluxing gravel; lump ceramic ground fluorspar; acid grades of fluorspar.

Crude iron ore, pig iron.

Lead ore; refined lead bars, ingots and pigs; antimonial lead bars, ingots and pigs.

Magnesite; dead burned magnesite.

Metallic magnesium pigs and ingots.

Manganese ore; ferromanganese; silicomanganese.

Ferromolybdenum; calcium molybdate; molybdenum oxide.

Refined pig tin.

Tunsten ore and concentrates; ferrotungsten; tungsten powder.

Vanadium ore and concentrates; ferrovanadium; vanadium pentoxide.

Zinc anodes, balls, oxides, powder, and slabs.

Small Plants' Share in Direct Army Contracts Up 20 Per Cent

Increase of 20 per cent in the dollar volume of prime contracts placed with small plants employing between 100 and 500 workers was recorded in February compared with January, the War Department announces.

Amount of work assigned to plants employing fewer than 100 workers increased to 10.9 per cent over January.

These increases were made despite the fact the grand total of work contracted by the seven supply branches of Services of Supply during February, a short month, declined 7.1 per cent from January.

As a result of the increases in business placed with small plants, their percentage of the total dollar volume of work, which had been running around one-fourth of the grand total in recent months, pushed up nearer the one-third mark. Exact figures are: 29.8 per cent of the total in February going to plants employing 500 or fewer workers, compared with 23.6 per cent in January, 24.1 per cent in December, and 23.7 per cent in November.

This volume of work embraces only direct commitments by the supply branches of the Army's Services of Supply, and is in addition to the large amount of subcontracting to small plants by the larger producers of war materiel.

The Quartermaster Corps, on of the heaviest buyers of the seven branches, placed about half its February volume of work ordered, 49.4 per cent, with plants employing 500 or fewer workers.

Billet Mill Held by Alien Property Custodian

Interest in a billet mill, costing more than $1,000,000, in custody of the United States Alien Property Custodian, is manifested by friendly countries abroad. The unit was ordered and paid for before Pearl Harbor by Mitsubishi Shoji Kaisha Ltd., for shipment to Japan.

It was designed in metric measurements and therefore not easily applicable to American operation; however, it is understood that now Brazil, Chile, Peru and Russia are all negotiating for it, with the sale, of course, subject to final approval by the WPB and Bureau of Economic Warfare.

Built by the Mesta Machine Co., Pittsburgh, the unit is designed to produce in excess of 6000 kilo-tons a year. It consists of six 24.8 inch 2-high roughing mills and five 21-inch 2-high finishing mills, and being, therefore, a comparatively light unit it cannot, it is pointed out, be used for producing large angles or channels of heavy cross section. Total weight of the unit, including a bloom shear, is estimated as 1500 net tons.

Also included in the assets of Mitsubishi, being held by the Alien Property Custodian, are four large rough forgings of chrome molybdenum steel, each 4½ feet in diameter and 21 feet long and weighing approximately 71 tons. The Mitsubishi assets are all on record with the New York office of the Alien Property Custodian, 120 Broadway.

"BUG BOMBS" PROTECT SOLDIERS IN TROPICS

INSECTICIDE "bombs," loaded with a liquid that is deadly to disease-carrying flies and mosquitos, but harmless to humans, are being used by the Army to protect the health of soldiers in the tropics. One of the cans contains enough material to fumigate 240 pup tents or 50 large bombers. They are being manufactured in an eastern plant of Westinghouse Electric & Mfg. Co.

Effects of fertilization on two rows of tomato plants are checked by William E. Lyons, victory gardens supervisor for Firestone Tire & Rubber Co., Akron, O. Results of the experiment are transmitted to Firestone employes to illustrate the benefits of extra care and to impart elementary gardening knowledge

Industrial Companies Urged To Aid Workers Avert Food Shortage

A MASTER plan for 20,000,000 company "Victory Gardens" in 1943 has been issued by the National Victory Garden Institute, New York. Its objective is "mobilization of the nation's manpower during spare hours to produce vital foods, to release commercial foodstuffs to the armed forces and our allies."

The plan, devised by L. A. Hawkins, International Harvester Co.'s horticultural expert, who supervised planting for that organization, suggests that industrial plants, railroads, public utilities and other large concerns provide spacious tracts of property for employes "in the belief that hundreds of employes will plant gardens if given the opportunity". The institute points out that never in history has the need for home-produced food been so urgent and employe gardens, in addition to contributing to the war effort, will cut the family food bill, promote health and provide outdoor exercise and relaxation.

Emphasis in the gardening plan is being placed on avoiding the waste of seeds, fertilizer, insecticides and effort. Proper soil conditions, careful planning and supervision will do much toward producing a successful garden project, the group believes. A competent executive from management is recommended to head each local organization and select employe committees to care for details.

Suggest Consulting Committees

It was found that many workers with gardening knowledge do not have suitable land available and their employers in many instances are assisting them in obtaining plots. The group says other prospective gardeners who have not had experience will learn quickly under proper guidance. Local victory garden committees, civilian defense leaders, county agents and experienced local gardeners should be consulted on details.

The institute states that the local committee should make a survey of employe reaction and learn how many employes have suitable land and how many need land. Available land should be located and inspected, with the land as near as possible to the plant or in vacant areas in home communities. Transportation and water supply must be considered when selecting land. A simple contract covering rental or use of property should be arranged and then each employe should be assigned a plot.

Employes applying for a plot agree to take care of the garden and utilize all they grow. The local committee then should arrange for plowing, harrowing and staking out of plots with the work being done by company-owned or rented equipment. Whether expenses will be absorbed by the company or prorated among the gardeners is an issue for the local committee to determine.

Plans for planting to fit the climate and other local conditions should be prepared and given to each gardener. Space should be allotted according to the number of members in the employe's family. A plot 30 feet wide and 100 feet long is average size. Proper vegetables, varieties and amount of seed needed should be indicated. Seed and fertilizer for the entire organization can be purchased wholesale by the company and sold to employe gardeners.

Next in the plan submitted by the institute is garden operations. After seedbed is prepared and garden plots are staked, planting is in order. Garden lectures or demonstrations aid inexperienced gardeners who need guidance and supervision. Supervisors appointed by the local committee should check at reg-

War gardens were laid out by General Electric Co. workers, above, at Schenectady, N. Y., during the first World war. At left, a typical group of victory gardens sponsored by an industrial concern last year. NEA photos

ular intervals the general care and cultivation of the garden. Watering during dry weather must be made possible and plants should be sprayed or dusted to control insects and plant diseases.

Conservation of crops for winter use is regarded as one of the most important phases of the victory garden movement. Root crop storage, record keeping of all data, co-operation with community canning centers, and home canning of crops, especially tomatoes and green beans, are stressed by the group.

Gardens Planted During 1930's

Mr. Hawkins supervised the planning of Army Gardens during World War I. Employe gardens sprung up again during the depression years when many companies throughout the country sponsored gardens and furnished their employes with seed and fertilizer at small cost. In this way thousands of families were able to feed themselves instead of relying upon federal and local relief.

"The present serious shortage of food is not a matter of concern for 1943 alone; it will be a problem for the duration and the years immediately following the war," Mr. Hawkins said. "Production of food through company, community and home gardens rank second only to the production of war materiel."

Companies interested may obtain copies of the plan from Andrew S. Wing, secretary-manager of the National Garden Institute, 598 Madison avenue, New York. The institute is privately supported, non-profit, educational corporation organized solely for the purpose of assisting in the war effort, co-operating with the Department of Agriculture and similar agencies. Paul C. Stark, Louisiana, Mo., is president. M. L. Wilson, director of extension division, Department of Agriculture, Washington, is honorary chairman.

Urgently Needed Wheelbarrows To Be Sent to South America

Four thousand wheelbarrows formerly used by WPA in Chicago will be turned over by the Treasury Department to the Office of Inter-American Affairs in Washington, for export shipment. This announcement was made by William Hershey, assistant procurement officer for the Treasury Department in the Chicago region. He said the transaction is being handled by the Office of Emergency Management. Tools, tractors, and other implements given to the procurement office by WPA also will be turned over to the Inter-American Affairs office through OEM, he added.

Mr. Hershey explained that all surplus equipment received from WPA, or any other agency must be offered by the Treasury Department to the Army, Navy, war plants, and government bureaus to save them purchasing new equipment.

The 400 wheelbarrows, which have been stacked in a vacant lot for some time, are to be shipped to South America, it is believed, in return for rubber.

Dealers in trucking tools and implements expressed surprise that the wheelbarrows would be exported when there is such a great demand for them by farmers and small gardeners. One dealer wrote to the procurement office asking if he might bid on them, but thus far had no reply. Spokesman for a large mail order house said American farmers need them worse than in any other countries, and stated that if the wheelbarrows were put up for sale, his house would be glad to take the whole lot.

DPC Authorizes Plant Expansions

CONTRACTS for new war plant facilities and equipment purchases were approved last week by Defense Plant Corp., which will retain title to the facilities. Contract figures are approximate and include:

Rheem Mfg. Co., South Gate, Calif., to provide plant facilities in California at a cost of $200,000.

Clifton Products Inc., Painesville, O., to provide plant facilities in Ohio at a cost of $210,000.

Allis-Chalmers Mfg. Co., Milwaukee, to provide additional equipment for a plant in Wisconsin at a cost of $315,000 resulting in an overall commitment of $2,300,000.

Auto Specialties Mfg. Co., St. Joseph, Mich., to provide additional equipment for a plant in Michigan at a cost of $80,000, resulting in an overall commitment of $3,580,000.

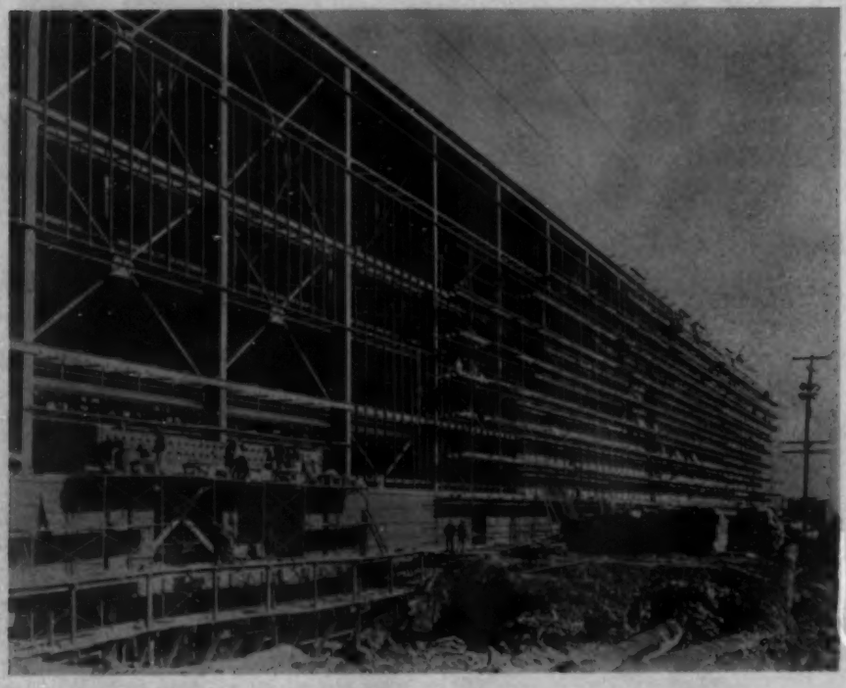
Fairchild Engine & Airplane Corp., New York, to provide additional machinery and equipment for a plant in New York at a cost of $750,000, resulting in an overall commitment of $8,900,000.

General Electric Co., Schenectady, N. Y., to provide additional plant facilities in New York at a cost of $460,000 resulting in an overall commitment of $3,880,000.

Interstate Aircraft & Engineering Corp., El Segundo, Calif., to provide additional facilities in Illinois at a cost of $220,000, resulting in an overall commitment of $910,000.

Gulf Distilling Corp., Gretna, La., to provide machinery and equipment at

SOUTH "CAN'T HIDE ELEPHANTS IN COTTON PATCH"



TWO gigantic structures for war purposes have been built recently in the South. One is an airship dock, now complete and in use; the other, one of the world's largest aircraft plants, nearing completion; both illustrated.

Location of the dock is not disclosed. It houses a fleet of airships which search the sealanes for submarines. The aircraft plant is near Atlanta, Ga.

If it were not for the fact that you can't hide elephants in a cotton patch practically nothing would be disclosed concerning these structures. Only general information has been released.

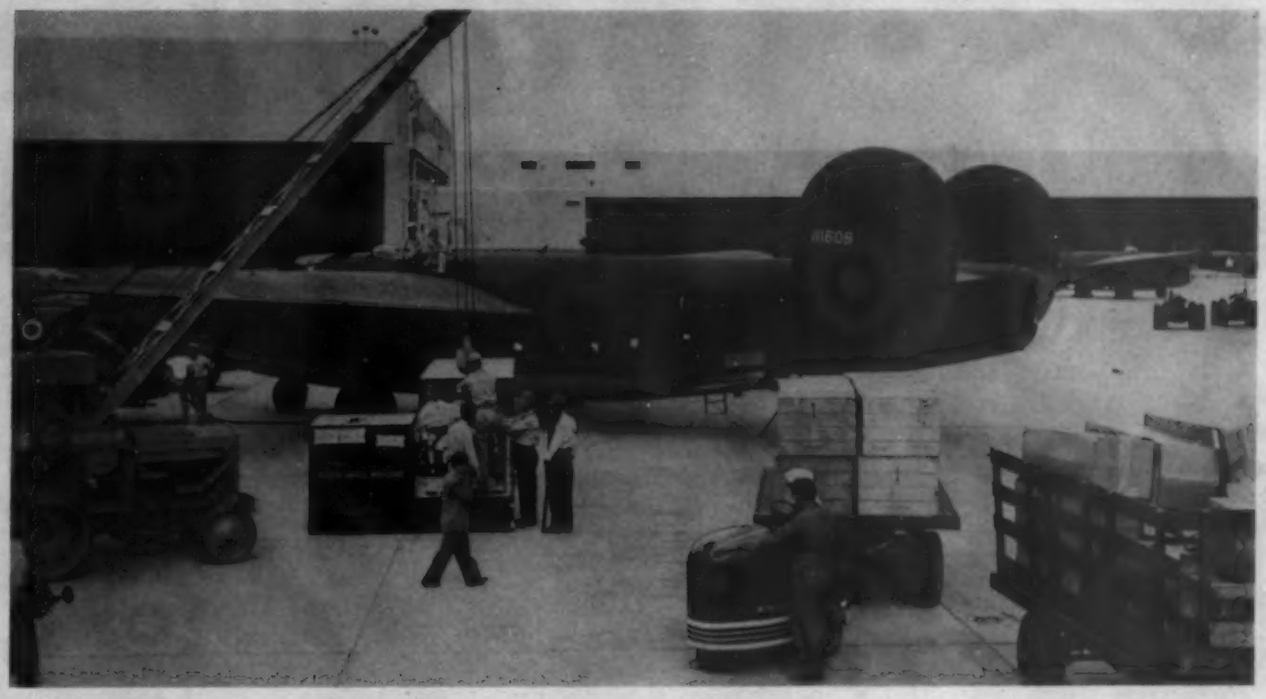
Officially it is said the aircraft plant's main assembly building is "large enough to house the nation's total annual cotton crop; nearly a mile of freight cars can be spotted inside, or a number of football games could be played simultaneously within its walls, while several three-ring circuses also gave performances.

"The project has absorbed enough structural steel, lighting, heating, ventilating, paving and drainage materials and facilities to build a city. Plant is heavily insulated and windowless; scores of primary contractors and hundreds of sub-contractors are working on it.

"Flow of workers will be controlled with precision. They will enter the plant through tunnels into the basement . . . a network of stairs will enable each to go to his job by the most direct route."

It will be operated by Bell Aircraft Corp. of Buffalo and Niagara Falls, N. Y., builders of the Army's cannon-carrying Airocobra fighter. Within its walls this company will manufacture long-range, multi-engined bombers "of a closely guarded design" for the Army Air Forces.

Concerning the airship dock even less information is available. It recently was stated to be "the largest structure in the South."



SPEED'S NEW ERA: Modified version of Liberator bomber (above) can transport more than 10 tons of cargo 4000 miles at 300 miles an hour; now used to ship army supplies. Like a flying bullet, the P-40 pursuit plane whizzes along at more than 350 miles an hour, carries six to 12 machine guns. NEA photos

—o—

a plant in Louisiana costing $125,000.

Tube Turns Inc., Louisville, Ky., to provide plant facilities in Kentucky at a cost of $6,525,000.

Republic Aviation Corp., Farmingdale, Long Island, N. Y., to provide for building conversion, machinery and equipment to subcontractors in various states at a cost of $10,000,000.

Aviation Corp., Williamsport, Pa., to provide additional plant facilities at a plant in Ohio at a cost of $630,000, resulting in an overall commitment of $2,710,000.

Chrysler Corp., Detroit, to provide additional plant facilities for a plant in Michigan at a cost of $800,000 resulting in an overall commitment of $2,465,000.

Huck Mfg. Co., Detroit, to provide additional plant facilities at a plant in Michigan at a cost of $200,000, resulting in an overall commitment of $570,000.

Carrollton Springs Pure Rye Distillery Inc., Baltimore, to provide equipment for a plant in Maryland to cost $200,000.

Tom Moore Distillery Co., Bardstown, Ky., to provide additional equipment at a plant in Kentucky at a cost of $55,000, resulting in an overall commitment of $80,000.

Ford Motor Co., Dearborn, Mich., to provide additional equipment for a plant in Michigan at a cost of $1,170,000, resulting in an overall commitment of $3,660,000.

Army Authorizes Expansions at Five Air Force Installations

Expansions of facilities at Air Force installations announced last week by the War Department include:

Fillmore county, Nebraska, to cost $2,000,000. Negotiated lump-sum contract for clearing and construction has been awarded to Olson-Assenmacher-Rokahr. Construction is being supervised by the Omaha district office of the Corps of Engineers.

Thayer county, Nebraska, to cost $2,000,000. Negotiated lump-sum contract for clearing and construction has been awarded to the Lancaster Corp. Construction supervised by the Omaha district office of the Corps of Engineers.

Clay county, Nebraska, to cost more than $2,000,000. Negotiated lump-sum contracts have been awarded to Olson-Assenmacher-Rokahr, for clearing and construction; and to Peter Kiewit & Sons, for taxiway construction. Supervised by the Omaha district office of the Corps of Engineers.

Polk county, Florida, to cost $1,000,000. Supervised by the Jacksonville district office of the Corps of Engineers.

Bossier parish, Louisiana, to cost $2,000,000. Supervised by the Little Rock district office of the Corps of Engineers.

Construction projects having a total cost of $297,000 were stopped during the week ended March 12. It was the second smallest weekly total reportetd since the Facility Review Committee was established in October.

D. O. James Mfg. Co., Chicago, which produced gears and gear reducers for the armed forces in the first World War, have been honored for outstanding performance in the present program. Company was presented the "E" award, above, by Capt. Robert Henderson, U. S. Navy (retired), and Maj. J. J. Teborek, U. S. Army. Miss E. V. James, president of the company, accepted for management

Treasury's "T" flag awarded to the Ansonia, Conn., branch of the American Brass Co. is raised by labor-management committee, below, which was responsible for signing up several thousand employes for 10 per cent or more of their wages for War Bonds

Two United States government citations stand out in the memory of Albert J. Weatherhead, president and founder, Weatherhead Co., Cleveland. During World War 1 as a member of the AEF, he was decorated by Gen. John J. Pershing for "Distinguished gallantry"; recently his company received the "E" for excellence in war production. Shown in photo at left are Maj. George L. Becker, Army Air Force; Mr. Weatherhead; Heyliger Church, John R. Cox, John W. Reavis, and E. L. Ferguson, all company officials

Pennant is unfurled, above, by workers at the Jenkins Bros. plant in Bridgeport, Conn., after a star had been added for continued outstanding production of valves

Glamorgan Pipe & Foundry Co. receives the burgee at Lynchburg, Va. Left to right, below, are: Gov. Colgate W. Darden Jr. of Virginia; Anthony F. Lloyd, employe representative; Col. John L. Person, U. S. Army; Lieut. William Geppert, U. S. Navy; John D. Capron, Glamorgan president; Rep. Clifton A. Woodrum, master of ceremonies

Silver's part in war production was stressed by G. H. Niemeyer, president, Handy & Harman, Bridgeport, Conn., on occasion of the presentation of the second Army-Navy award to the company. The precious metal, he said, is providing better linings for aircraft bearings, electrical contacts and is widely used in brazing alloys. Above is shown a group of employes attending presentation ceremonies

Metalworking Companies Cited by Armed Services

Selected to receive the joint Army-Navy production awards for outstanding execution of war contracts last week were:

Bossert Co., Utica, N. Y.
Broderick Co., Muncie, Ind.
Chicago Extruded Metals Co., Cicero, Ill.
Columbus Bolt Works Co., Columbus, O.
Crucible Steel Co. of America, Park Works, Pittsburgh.
Donner Hanna Coke Corp., Buffalo.
Eagle Tool & Machine Co., Springfield, O.
Holley Carburetor Co., Detroit.
Houdaille-Hershey Corp., Oakes Products Division, North Chicago.
Kensington Steel Co., Chicago.
Mosler Safe Co., Hamilton, O.
Motor Products Corp., Detroit.
Mullins Mfg. Corp., Salem, O., and Youngstown Pressed Steel Division, Warren, O.
Pangborn Corp., Hagerstown, Md.
Safety Car Heating & Lighting Co., New Haven, Conn.
Singer Mfg. Co., Bridgeport Plant, Bridgeport, Conn.
Steel Cooperage & Coating Co., Detroit.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Union Metal Mfg. Co., Canton, O.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Youngstown Metal Products Co., Girard, O.

Exhibit To Tie in with Engineers' National Meeting and War Effort

CHARACTERIZED as the "War Production Edition", a 1943 Machine and Tool Progress Exhibition will be staged by the American Society of Tool Engineers in the Auditorium, Milwaukee, March 25, 26 and 27.

The exhibition, which will fill Mechanics Hall of the Auditorium, not only will tie in directly with war production because of the nature of the exhibits and of the highly specialized consulting engineering talent of exhibitors' representatives, but further emphasizes this connection by furnishing actual demonstrations of many of the new and important devices and techniques which will be dealt with by speakers of national repute during the technical sessions of the annual meeting of the society, held simultaneously and in the same building, with the exhibition.

The technical sessions, which will get under way Thursday evening (the Exhibition opens at noon Thursday) will be in the nature of symposiums but will in each case center around one or two major speakers who are recognized authorities in their respective fields. Subjects to be dealt with include: "Machineability of Metals" (NE steels in particular); "Increasing Tool Life"; "Tool Salvage by Low Temperature Brazing," "Tool Salvage by Silver Brazing," and "Tool Salvage by Welding with Cast High Speed Steel Rods;" "Women in Machine Shops;" "Producing Finished Gears without Machining;" "High Speed Machining of Aircraft Parts;" "Developments in Glass Gages;" and "Possibilities of Induction Heating." The meeting will close Saturday evening with a dinner at which Brig. Gen. H. F. Safford, chief of the Production Service Branch, Ordnance Department, U. S. Army, will be the principal speaker.

Regarding the reasons for and scope of the exhibition, Otto Winter, national president, ASTE, said: "At our annual meeting a year ago in St. Louis, the society voted to discontinue its machine and tool progress exhibitions 'for the duration' to conserve manpower and to eliminate tieups of equipment for the period of the war.

"It appears, however, that the problem of simplifying the war production job is so vital today that an exhibition of developments designed to simplify or expedite the war production job will be of great immediate benefit to industry.

"In co-operation with the program of the Office of Defense Transportation, we have discouraged the exhibiting of items of heavy equipment which would have to be shipped into Milwaukee. In place of the equipment itself, exhibitors in such cases will provide comprehensive photographs and literature which in the hands of well-informed technically trained representatives will be made adequately to convey vitally important and new information to men responsible for war production.

"On the other hand, as far as other exhibits are concerned, a checkup among tool engineers has indicated a strong desire for facilities in the show whereby rapid but comprehensive firsthand surveys can be made of significant new equipment and materials—including tools, gages, accessories, small machines, systems, cutting materials, etc. Keen interest of tool engineers, production men and other industrial engineers and executives in developments of this kind exists just at this time because of the current absorption into the metalworking industries of untold thousands of new and relatively unskilled workers—including a rapidly increasing proportion of women. This condition demands that tooling generally be revised in the direction of increased simplicity and ruggedness, maximum safety and in many cases a higher degree of automatic operation. Both in the exhibition and in the technical sessions these points will be dealt with constructively."

Comprehensive coverage of the exhibition and of the technical sessions will

—o—

LITTLE CHIPS, BIG VICTORY

A MASS of mixed chips, paper and rubbish in the chip pan of a machine tool today is a source of serious complaint. To insure segregation of priceless metal and alloy chips right at their source, Bendix Aviation Ltd., North Hollywood, Calif., issues "V-signs" to machine operators with the job blueprint and instruction cards. No operator worthy of the name can fail to do his part when one of these "V-signs" is in front of him. Company reports "50 per cent improvement" in chip conservation

be one of the features in the April 5 issue of STEEL.

The official list of exhibitors follows, corrected as of the time the current issue of STEEL went to press.

—A—

Alloy-Sprayer Co., Detroit.
American Machinist, New York.
Ampco Metal Co., Milwaukee.
American Precision Products Co., Milwaukee.
Anderson & Sons, Westfield, Mass.
Anker Holth Mfg. Co., Chicago.
R. B. Annis Co., Indianapolis.
Aro Equipment Co., Bryan, O.
E. C. Atkins & Co., Indianapolis.
Automotive & Aviation Industries, Philadelphia.
W. O. Barnes Co., Detroit.

—B—

Bakewell Mfg. Co., Los Angeles.
The Bellows Co., Cleveland.
Black Diamond Saw & Machine Works, Natick, Mass.
Black Drill Co., Cleveland.
Edward Blake Co., Newton Centre, Mass.
Blank & Buxton Machinery Co., Jackson, Mich.
Henry Boggis & Co., Cleveland.
Boice Crane Co., Toledo, O.
Bokum Tool Co., Detroit.
Boyar Schultz Corp., Chicago.
Bradley Machinery Co., Detroit.
Bramson Publishing Co., Detroit.
Bridgeport Machine Inc., Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence, R. I.
Charles Bruning Co., Chicago.

—C—

Capewell Mfg. Co., Hartford, Conn.
Carbide Tool Co., Chicago.
Carboloy Co., Detroit.
Carpenter Steel Co., Reading, Pa.
Catskill Metal Works Inc., Catskill, N. Y.
Chicago Mfg. & Distributing Co., Chicago.
Cincinnati Tool Co., Norwood, Cincinnati.
Cleveland Tool Engineering Co., Cleveland.
Conant Tool & Engineering Co., Chicago.
Cooper-Mast Corp., New York.
Continental Machines, Milwaukee.
Continental Machines, Minneapolis.

—D—

Davis Boring Tool Division, St. Louis.
Deepfreeze Division, Motor Products Corp., North Chicago, Ill.
Delta Mfg. Co., Milwaukee.
Detroit Power Screwdriver Co., Detroit.
Detroit Stamping Co., Detroit.
Detroit Universal Duplicator Co., Detroit.
DeWalt Products, Lancaster, Pa.
The Dumore Co., Racine, Wis.
Durant Mfg. Co., Milwaukee.
Duro Mfg. Co., Los Angeles.

—E—

East Shore Machine Products, Cleveland.
R. E. Ellis Engineering Co., Chicago.
Engineering Sales Co., Sheboygan, Wis.
Eutectic Welding Alloys Co., New York.

—F—

Fansteel Metallurgical Corp., Chicago.
Firth-Sterling Steel Co., Chicago.
Ford Motor Co., Dearborn, Mich.

—G—

Genesee Tool Co., Fenton, Mich.
Gorham Tool Co., Detroit.
Grinding Machinery Co., Detroit.
Gray Mills Co., Chicago.
Grob Brothers, Grafton, Wis.

—H—

H. & H. Research Co., Detroit.
Hammond Machinery Builders Inc., Kalamazoo, Mich.
Hardinge Bros., Elmira, N. Y.
Huot Mfg. Co., St. Paul.
Charles L. Jarvis Co., Middletown, Conn.

—I—

Ideal Commutator Dresser Co., Sycamore, Ill.
The Industrial Press, New York, N. Y.
The Iron Age, New York.

—J—

Johnson Gas Appliance Co., Cedar Rapids, Wis.

—K—

Kold-Hold Mfg. Co., Lansing, Mich.
Knu-Vise Inc., Detroit.
Koebel Diamond Tool Co., Detroit.

—L—

LaSalle Designing Co., Chicago.
H. Leach Machinery Co., Chicago.
Link Engineering Co., Detroit.
Lipe-Rollway Corp., Syracuse, N. Y.

—M—

Madison Mfg. Co., Muskegon, Mich.
Majestic Tool & Mfg. Co., Detroit.
McCaskey Register Co., Alliance, O.
McKenna Metal Co., Latrobe, Pa.
Michigan Tool Co., Detroit.
Micromatic Hone Corp., Detroit.
Milling Machine Adapter Corp., Detroit.

—N—

Nash-Zempel Tools, Milwaukee.
National Broach & Machine Co., Detroit.
National Tool Salvage Co., Detroit.
Neff Kohlbusch & Bissell, Chicago.
W. H. Nichols & Son, Waltham, Mass.

—O—

O'Neil-Irwin Mfg. Co., Minneapolis.

—P—

Pate Oil Co., Milwaukee.
Peerless Machine Tool Co., Racine, Wis.
Physicists' Research, Ann Arbor, Mich.
Pioneer Pump & Mfg. Co., Detroit.
Porter Cable Co., Syracuse, N. Y.
Portman Machine Tool Co., Mt. Vernon, N. Y.
Progressive Welder Co., Detroit.

—R—

Racine Tool & Machinery Co., Racine, Wis.
Reliable Tool Machine Works, Milwaukee.
Republic Tool Co., Los Angeles.
L. L. Richards Machinery Co., Milwaukee.
David J. Ross Co., Benton Harbor, Mich.
Ross Operating Valve Co., Detroit.

—S—

Sav-Way Industries, Detroit.
Schauer Machine Co., Cincinnati.
Claude B. Schneible Co., Chicago.
George Sherr Co., New York.
Screw Machine Engineering, Rochester, N. Y.
Severance Tool Mfg. Co., Saginaw, Mich.
Size Control Co., Chicago.
Snyder Tool & Engineering Co., Detroit.
Standard Gage Co., Poughkeepsie, N. Y.
Standard Press Steel Co., Milwaukee.
Stokerunit Corp., Milwaukee.
D. A. Stuart Oil Co., Chicago.
Willis Stutson Association, Chicago.
Sunnen Products Co., St. Louis.
Super Tool Co., Detroit.
Swedish Gage of America, Detroit.

—T—

Techtmann Industries Inc., Milwaukee.
Trico Products Corp., Buffalo.

—U—

Ultra-Lap Machine Co., Detroit.
Universal Engraving & Colorplate Co., Cleveland.

—V—

Vascoloy-Ramet Corp., North Chicago, Ill.
Van Norman Machine Tool Co., Springfield, Mass.
Vickers Inc., Detroit.

—W—

Wells Mfg. Corp., Three Rivers, Mich.
Westinghouse Electric & Mfg. Co., East Pittsburgh.
Wetmore Reamer Co., Detroit.
Whirlwind LawnMower Corp., Milwaukee.
Wilson Mechanical Instrument Co., New York.

Jones & Laughlin's Income Off 1/3 on Record Output

Net income of Jones & Laughlin Steel Corp., Pittsburgh, in 1942 was $10,141,690, or $4.49 a common share, compared with $15,499,983, or $10.85 a share, in 1941. Provision for contingencies in latest period totaled $1,000,000, half the amount set aside in 1941. Allowance for federal income taxes was $5,830,000 and for excess profits tax, after $1,850,000 debt retirement credit, $18,170,000. In 1941 taxes totaled $15,119,993.

H. E. Lewis, chairman and president, explained in company's annual statement that part of the decline in per share earnings was attributable to the purchase, in June, 1942, of Otis Steel Co., thus increasing capital stock outstanding.

The Otis Steel properties yielded about $100,000 in profits during the last six months of 1942. According to Mr. Lewis, the unfavorable showing of Otis was due principally to the low-profit type of products to which output was confined by war requirements. High-priced purchased coke, pig iron and scrap were also contributing factors.

Corporation's plants operated last year at 103 per cent of capacity, producing 4,548,844 net tons, including 529,774 tons reported by Otis in the last six months of the year. This compares with production of 3,887,335 tons on operations averaging 99 per cent of capacity in 1941.

Lehman Bros. Acquires Control of Andrews Steel

Syndicate formed by Lehman Bros., New York investment firm, and associates including Norman B. Schreiber, last week purchased for investment all of the outstanding capital stock of Andrews Steel Co., Newport, Ky. Members of the Andrews family who have been directors and officers retired from the management, following election of Mr. Schreiber as president. H. W. Boals will continue as treasurer. No public offering of securities is contemplated.

United Engineering & Fdry. Co.

Effect of a voluntary refund on war contracts totaling $1,766,000 is reflected in 1942 earnings of United Engineering & Foundry Co., Pittsburgh, which declined $204,299 from the 1941 high to $3,104,998. After preferred dividends, this equals $3.71 per common share against $3.96 in previous year. No provision has been made for possible further renegotiation, since the amount, if any,

cannot presently be determined, company reports. Local, state and federal taxes of $10,033,102 were provided for an amount equivalent to 75.2 per cent of earnings before deduction for this purpose.

International Nickel Co.

International Nickel Co. of Canada Ltd., Copper Cliff, Ontario, Canada, earned net profit of $33,301,829 in 1942, equal to $2.15 a share on common, against net of $34,356,401, or $2.22 a share, in preceding year. After deducting $600,000 estimated refundable portion of excess profits taxes, provision for income and franchise taxes amounted to $24,479,285. December quarter net totaled $8,924,705, contrasting with $8,660,463 in comparable 1941 quarter.

Vanadium Corp. of America

Net profit of Vanadium Corp. of America, New York, last year amounted to $542,094, equivalent to $1.33 a share, after contingency reserve of $150,000. This compares with $1,231,752, or $3.03 a share, in 1941. Federal income and excess profits taxes totaled $1,268,000, after $52,000 deduction of postwar credit. In previous year federal taxes were $2,105,000.

American Smelting & Refining Co.

American Smelting & Refining Co., New York, reported net income in 1942 as $12,252,352, equal to $3.99 per common share, after all charges including taxes, compared with $15,742,662, or $5.59 per share, in 1941.

Westinghouse Orders Up 85%; Net Declines 25%

Reflecting industry's accelerated production during the first year of war, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., reported orders received in 1942 increased 85 per cent over 1941 to $1,079,636,268. Company's annual statement shows an increase in billings of 32 per cent, while backlog rose 121 per cent. Net income last year was $17,366,841, against $23,117,510 in 1941, a decrease of 25 per cent. Tax bill amounted to $71,446,548, compared with $61,537,295 the year before.

New York Curb Exchange has been notified that holders of 3 per cent fixed interest and 3 per cent income mortgage bonds, due Oct. 1, 1951, of Scullin Steel Co., St. Louis, will receive interest payments April 1 on the following basis: $15 per $1000 bond upon surrender of fixed interest coupon No. 13 and additional interest of $30 per $1000 bond upon surrender of income interest coupon No. 6, both maturing April 1.

Canadian War Firms Report Higher Profits

Annual reports of a number of Canadian corporations engaged principally in war work reflect, by improved 1942 earnings, the unprecedented expansion of industrial production in the Dominion. Tabulated below are four such firms and net profit in the two latest years:

	Net Profit 1942	1941
Page-Hersey Tubes Ltd., Toronto	$943,360	$917,926
Canada Wire & Cable Co., Toronto	1,091,181	1,043,147
Canada Foundries & Forgings, Toronto	262,933	105,010
General Steel Wares Ltd., Montreal	598,937	555,769

129 CONSUMERS' AGGREGATE 1942 PROFIT DOWN $64,801,299

COMBINED net profit earned by 129 iron and steel consumers in 1942 was $359,151,884. Total was $64,801,299, or nearly 16 per cent, less than their aggregate net income in 1941, which amounted to $423,953,183. Increased costs, inventory writedowns, depreciation of equipment, greatly expanded reserves for taxes and contract renegotiation contributed to the reductions. The following table lists 72 companies. In the March 15 issue, p. 89, 57 firms were listed.

	1942	1941
Acme Wire Co., Hartford, Conn.	$ 318,261	$ 349,721
Aero Supply Mfg. Co. Inc., Corry, Pa.	447,968	805,796
Aetna Ball Bearing Mfg. Co., Chicago	251,576	264,269
American Screw Co., Providence, R. I.	353,275	407,010
American Laundry Machinery Co., Cincinnati	1,206,832	2,166,557
American Machine & Metal Co., New York	646,996	785,980
American Stove Co., St. Louis	578,629	1,423,297
Autocar Co., Ardmore, Pa.	1,351,803	1,492,816
Automatic Voting Machine Co., Jamestown, N. Y.	247,752	409,271
Aviation Corp., New York	4,723,894	2,454,142
Baldwin Locomotive Works, Philadelphia	4,516,344	3,356,914
Bell Aircraft Corp., Buffalo	4,203,583	1,970,645
Bliss & Laughlin Inc., Harvey, Ill.	603,094	909,727
Briggs & Stratton Corp., Milwaukee	1,783,898	1,154,759
Buffalo Forge Co., Buffalo	1,042,627	1,145,804
Burroughs Adding Machine Co., Detroit	4,506,801	4,771,305
Bucyrus-Erie Co., South Milwaukee, Wis.	1,683,996	2,422,677
Chicago Pneumatic Tool Co., New York	2,033,817	2,766,602
Clark Equipment Co., Buchanan, Mich.	2,069,883	2,181,507
Cleveland Graphite Bronze Co., Cleveland	1,510,897	1,501,359
Combustion Engineering Co. Inc., New York	2,011,081	1,058,093
Consolidated Aircraft Corp., San Diego, Calif.	10,323,779	8,024,882
Continental Roll & Steel Foundry Co., East Chicago	1,935,856	† 1,449,638
Cooper-Bessemer Corp., Mt. Vernon, O.	820,000	1,050,457
Crane Co., Chicago	9,324,603	7,727,819
Cutler-Hammer Inc., Milwaukee	*1,510,782	1,498,616
Deere & Co., Moline, Ill.	12,709,426	14,269,420
Doehler Die Casting Co., Toledo, O.	806,231	1,297,707
Electric Auto-Lite Co., Toledo, O.	4,078,569	5,866,211
Elgin National Watch Co., Elgin, Ill.	1,123,627	1,550,721
Eureka Vacuum Cleaner Co., Detroit	170,437	126,713
Gardner-Denver Co., Quincy, Ill.	1,369,563	1,445,698
General Fireproofing Co., Youngstown, O.	575,497	1,252,716
Hayes Mfg. Corp., Grand Rapids, Mich.	181,762	71,235
Holland Furnace Co., Holland, Mich.	1,494,473	2,093,070
Houdaille-Hershey Corp., Detroit	1,647,354	2,420,171
International Harvester Co., Chicago	26,746,552	30,634,588
Kellogg Switchboard & Supply Co., Chicago	212,541	564,211
Kansas City Structural Steel Co., Kansas City	233,175	218,388
Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.	453,557	482,160
Link-Belt Co., Chicago	3,478,829	2,913,060
Marchant Calculating Machine Co., Oakland Calif.	745,991	926,844
Marion Steam Shovel Co., Marion, O.	610,378	539,963
Mesta Machine Co., Pittsburgh	3,625,763	3,607,738
Minneapolis-Honeywell Regulator Co., Minneapolis	2,868,008	2,737,295
Mullins Mfg. Corp., Salem, O.	901,012	924,331
National Cash Register Co., Dayton, O.	3,136,652	3,257,446
National Malleable & Steel Castings Co., Cleveland	1,135,768	1,779,740
National Supply Co., Pittsburgh	4,108,331	5,722,268
New York Shipbuilding Corp., New York	3,042,610	3,074,533
Niles-Bement-Pond Co., Hartford, Conn.	3,249,081	2,536,406
Page-Hersey Tubes Ltd., Toronto	943,360	917,427
Parkersburg Rig & Reel Co., Parkersburg, W. Va.	764,744	544,008
Piper Aircraft Corp., Lock Haven, Pa.	115,365	210,883
Pressed Steel Car Co. Inc., Pittsburgh	2,528,786	812,528
Reynolds Spring Co., Jackson, Mich.	109,966	90,286
Royal Typewriter Co. Inc., New York	174,321	1,281,629
Seagrave Corp., Columbus, O.	129,838	137,553
Simonds Saw & Steel Co., Fitchburg, Mass.	1,802,653	2,433,139
South Bend Lathe Works, South Bend, Ind.	859,367	† 916,891
Standard Tube Co., Detroit	85,282	339,373
Studebaker Corp., South Bend, Ind.	2,048,278	2,486,397
Sullivan Machinery Co., Michigan City, Ind.	804,112	753,051
TelAutograph Corp., New York	144,542	109,475
Thompson Products Inc., Cleveland	2,051,417	1,722,689
United Aircraft Corp., New York	17,096,841	16,721,381
United Engineering & Foundry Co., Pittsburgh	3,104,998	3,309,297
Union Tank Car Co., Chicago	2,701,286	2,238,956
Vultee Aircraft Inc., Los Angeles	4,291,140	3,100,735
Wagner Electric Corp., St. Louis	782,770	1,427,795
Walworth Co. Inc., New York	2,063,189	2,003,137
Warren Foundry & Pipe Corp., Phillipsburg, N. J.	612,532	658,418

*Preliminary. †11 Months.

More Liberal Price Policy in Prospect?

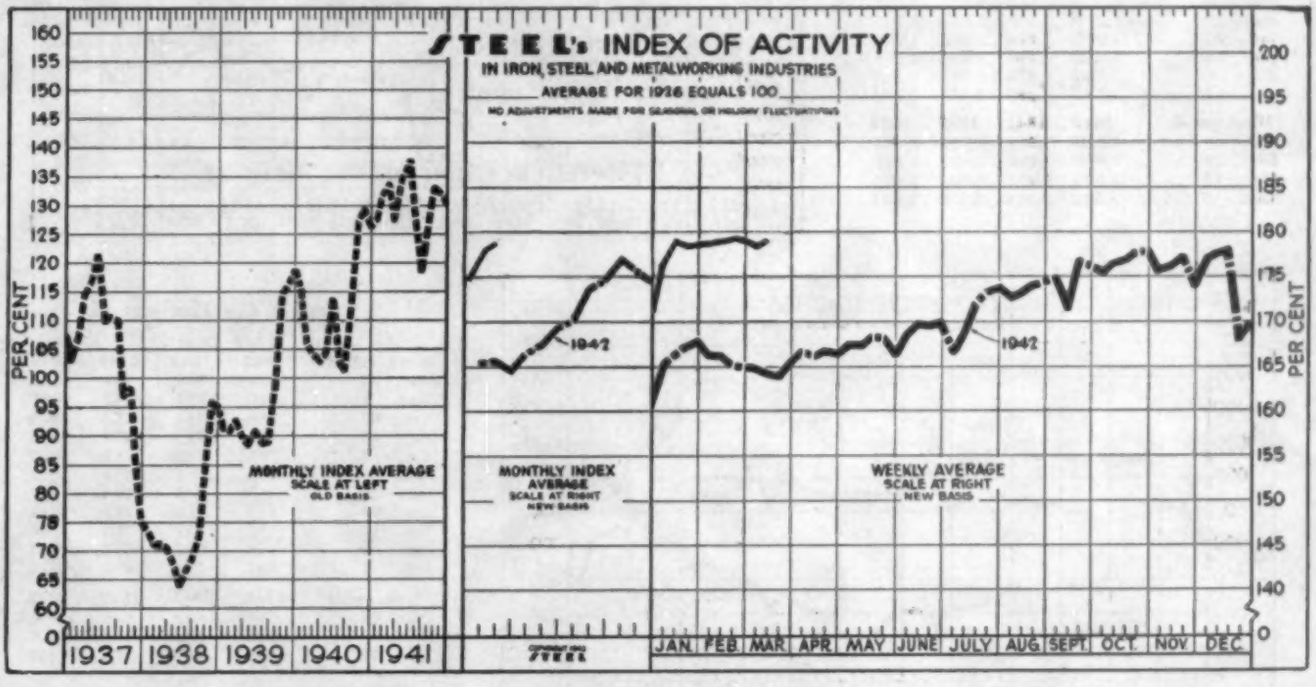
HOLDING the interest of business in the past week were several developments which may bring a measure of satisfaction to small and large enterprises.

The OPA now appears to be leaning toward a more liberal policy on prices so as to leave reasonable profits. Concurrent with publication of annual reports, industrial groups have put pressure on Congress to amend the contract renegotiation law so that excess war profits may be determined before, rather than after, deduction of other taxes. In yet another direction, hope is found in the intensification of SWPC's spread-work drive on behalf of small plants.

Business was more active in the latest week, measured by STEEL's index, which by March 13 had recovered 0.6 point from 178.2 on March 6, raising the level to 178.8, within a fraction of the year's high to date.

In the latest period the steel industry operated at 99 per cent of capacity, off ½ point from the record three weeks preceding it. Electrical energy distributed totaled 3,944,679,000 kilowatt hours, decline of less than 0.1 per cent from March 6 and 17.5 per cent above a year ago. Carloadings' final figure is expected to include an additional 10,000 cars in use over prior week.

In February the steel industry produced 6,811,882 ingot tons for what might have been the second highest month on record had it not been cut down by a 28-day operating period. Output was 290,826 tons greater than that of February, 1942. Demonstrating the efficacy of national campaigns to make scrap readily available, scrap consumption in January reached 4,753,000 tons, against 4,693,000 in December. With sufficient material for current use at the mills, the first month of 1943 was the fourth largest in history. However, there are indications that the supply is tightening.



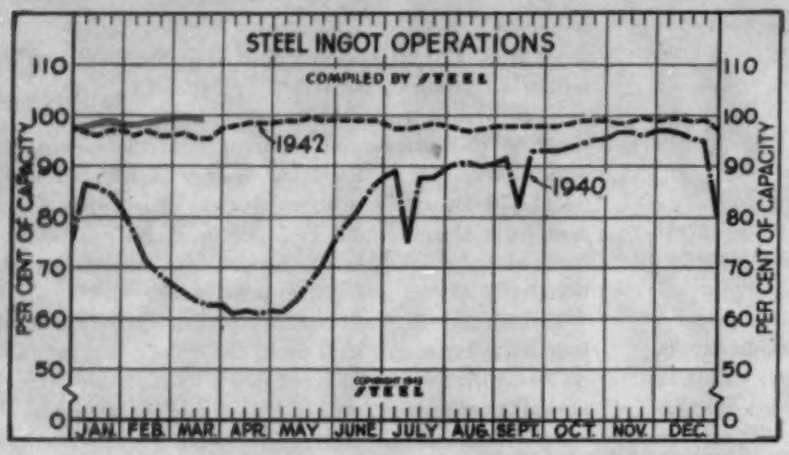
STEEL'S index of activity rose 0.6 point to 178.8 in the week ending Mar. 13:

Week Ended	1943	1942
Mar. 13	178.8†	164.1
Mar. 6	178.2	164.8
Feb. 27	178.9	165.0
Feb. 20	179.0	165.1
Feb. 13	178.8	166.2
Feb. 6	178.6	166.3
Jan. 30	178.6	167.9
Jan. 23	178.1	167.4
Jan. 16	178.9	166.6
Jan. 9	176.7	165.6
Jan. 2	171.0	161.0

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	178.1	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6
Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3
March		164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
April		166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8
May		167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
June		169.4	138.7	114.1	90.9	65.4	109.9	100.3	77.4	80.6	70.3	51.4
July		171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1
Aug.		173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
Sept.		174.8	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5
Oct.		176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4
Nov.		175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5
Dec.		174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production



Steel Ingot Operations

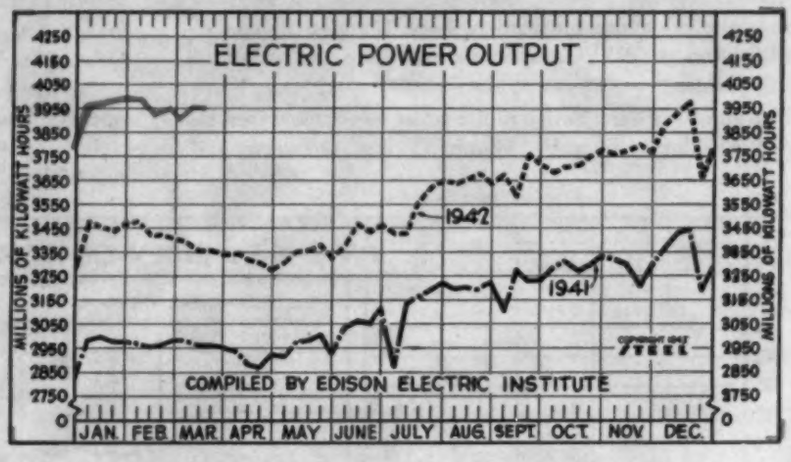
(Per Cent)

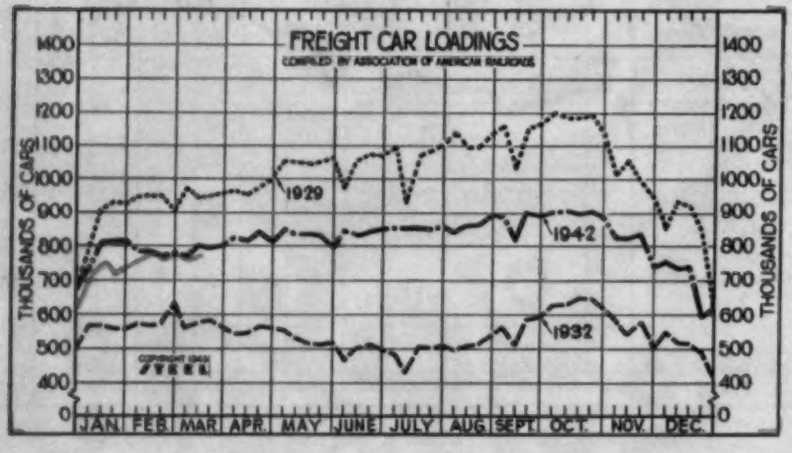
Week ended	1943	1942	1941	1940
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	63.5
Feb. 27	99.5	96.0	96.5	65.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0
Jan. 30	98.5	97.0	97.0	76.5
Jan. 23	99.0	97.0	95.5	81.5
Jan. 16	99.0	96.0	94.5	84.5
Jan. 9	97.5	96.5	93.0	86.0
Jan. 2	97.5	97.5	92.5	86.5
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	99.0	93.5	80.0	75.5
Dec. 19	99.0	97.5	95.0	90.5
Dec. 12	99.5	97.5	95.5	92.5
Dec. 5	99.5	96.5	96.5	94.0

Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
Mar. 13	3,945	3,357	2,818	2,460
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,893	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,939	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,523
Jan. 30	3,977	3,468	2,830	2,541
Jan. 23	3,974	3,440	2,980	2,661
Jan. 16	3,952	3,450	2,996	2,674
Jan. 9	3,953	3,473	2,985	2,688
Jan. 2	3,780	3,289	2,831	2,558
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	3,656	3,234	2,757	2,465
Dec. 19	3,976	3,449	3,052	2,712
Dec. 12	3,938	3,431	3,004	2,674
Dec. 5	3,884	3,368	2,976	2,654


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1942
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
Mar. 13	758†	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634
Feb. 20	752	775	678	595
Feb. 13	765	783	721	608
Feb. 6	755	784	710	627
Jan. 30	735	816	714	657
Jan. 23	709	818	711	649
Jan. 16	753	811	703	646
Jan. 9	716	737	712	668
Jan. 2	621	674	614	592
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	592	607	545	550
Dec. 19	743	799	700	655
Dec. 12	740	807	736	681

†Preliminary.

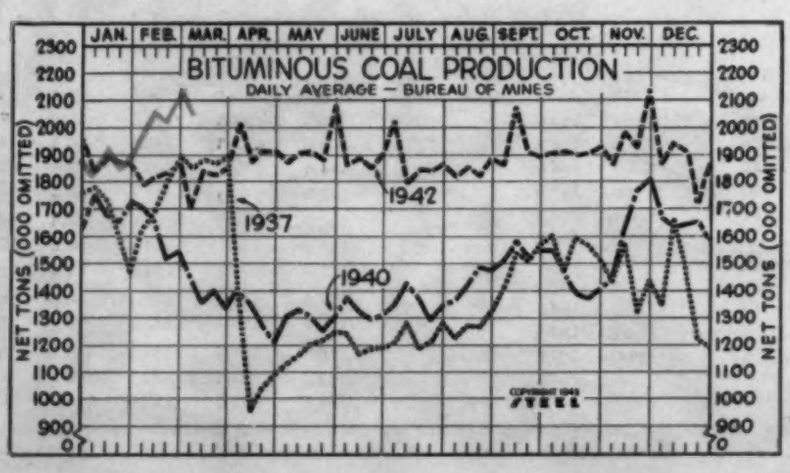
Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

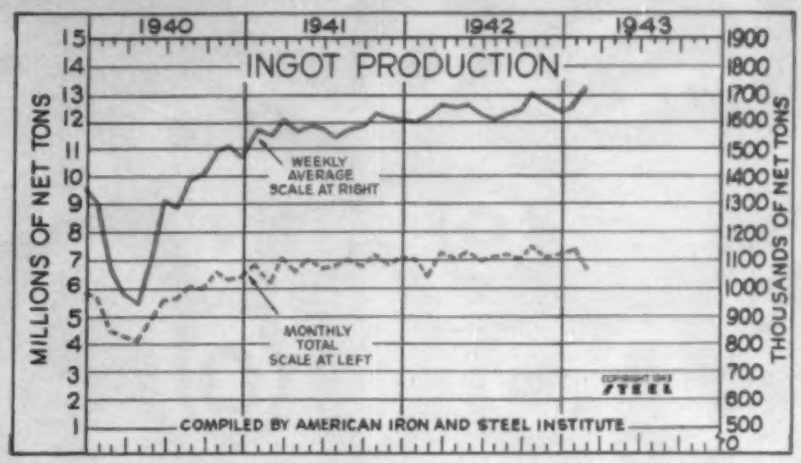
Week ended	1943	1942	1941	1937
Mar. 6	2,048†	1,693	1,791	1,851
Feb. 27	2,113	1,878	1,736	1,897
Feb. 20	2,027	1,833	1,736	1,807
Feb. 13	2,033	1,817	1,736	1,696
Feb. 6	1,980	1,793	1,683	1,634
Jan. 30	1,900	1,866	1,684	1,466
Jan. 23	1,867	1,886	1,656	1,605
Jan. 16	1,929	1,883	1,609	1,731
Jan. 9	1,833	1,842	1,691	1,780
Jan. 2	1,860	1,960	1,762	1,764
Week ended	**1942**	**1941**	**1940**	**1937**
Dec. 26	1,714	1,632	1,591	1,230

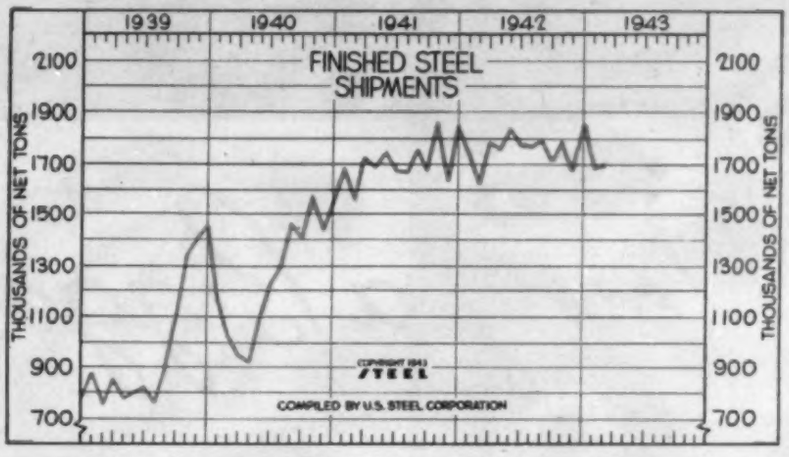
†Preliminary.


BITUMINOUS COAL PRODUCTION
DAILY AVERAGE — BUREAU OF MINES
NET TONS (000 OMITTED)
1942
1937
1940
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Steel Ingot Production
(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1943	1942	1943	1942
Jan.	7,408.7	7,124.9	1,672.4	1,608.3
Feb.	6,811.8	6,521.1	1,720.9	1,630.3
Mar.	.. ..	7,392.9	.. .	1,668.8
Apr.	.. .	7,122.3	.. ..	1,660.2
May	.. ..	7,386.9	.. ..	1,667.5
June	.. ..	7,022.2	.. ..	1,636.9
July	.. ..	7,148.8	.. ..	1,617.4
Aug.	.. ..	7,233.5	.. ..	1,632.8
Sept.	.. ..	7,067.1	.. ..	1,651.2
Oct.	.. ..	7,584.9	.. ..	1,712.2
Nov.	.....	7,184.6	.. ....	1,674.7
Dec.	.....	7,303.2	.....	1,652.3
Total	.....	83,092.2	.....	1,651.2



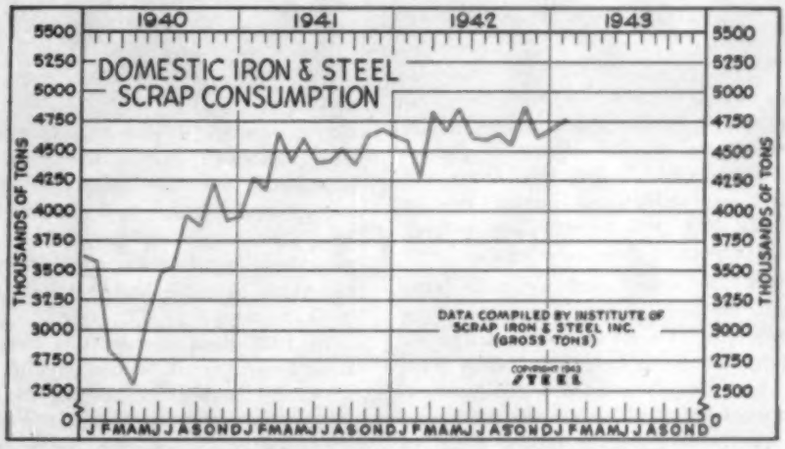


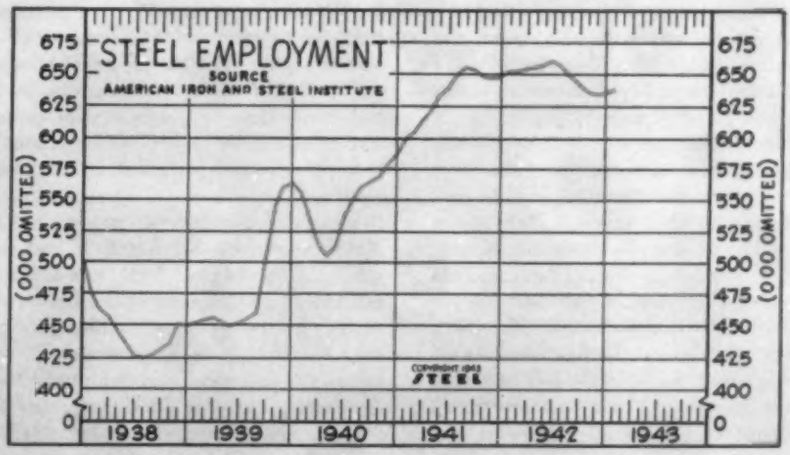
Finished Steel Shipments
U. S. Steel Corp.
(Unit 1000 Net Tons)

	1943	1942	1941	1940	1939
Jan.	1685.9	1738.9	1682.5	1145.6	870.9
Feb.	1691.5	1616.6	1548.5	1009.3	747.4
Mar.	.....	1780.9	1720.4	931.9	845.1
Apr.	.....	1758.9	1687.7	907.9	771.8
May	.....	1834.1	1745.3	1084.1	795.7
June	.....	1774.1	1668.6	1209.7	807.6
July	.....	1765.7	1666.7	1296.9	745.4
Aug.	.....	1788.7	1753.7	1455.6	885.6
Sept.	.....	1703.6	1664.2	1392.8	1086.7
Oct.	.....	1787.5	1851.3	1572.4	1345.9
Nov.	.....	1665.5	1624.2	1425.4	1406.2
Dec.	.....	1849.6	1846.0	1544.6	1444.0
Tot.	.....	.....	20,458.9	15,013.7	11707.3

Iron and Steel Scrap Consumption
(Gross Tons)
(000 omitted)

	1943	1942	1941	1940
Jan.	4,753	4,590	4,278	3,581
Feb.	.....	4,276	4,172	2,812
Mar.	.....	4,840	4,662	2,728
Apr.	.....	4,672	4,406	2,548
May	.....	4,857	4,609	3,061
June	.....	4,608	4,406	3,482
July	.....	4,600	4,415	3,526
Aug.	.....	4,645	4,518	3,968
Sept.	.....	4,556	4,392	3,876
Oct.	.....	4,883	4,649	4,233
Nov.	.....	4,621	4,482	3,922
Dec.	.....	4,693	4,634	3,950
Total	.....	55,841	53,623	41,687
Mo. Av.	.....	4,653	4,468	3,474


1940
1941
1942
1943
DOMESTIC IRON & STEEL SCRAP CONSUMPTION
DATA COMPILED BY INSTITUTE OF SCRAP IRON & STEEL INC. (GROSS TONS)
THOUSANDS OF TONS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
STEEL



Steel Employment
(000 omitted)

	1943	1942	1941	1940	1939
Jan.	637	651	598	556	451
Feb.	...	651	603	538	453
Mar.	...	653	613	514	455
Apr.	...	654	621	503	452
May	...	656	632	510	448
June	...	659	638	535	451
July	...	655	648	549	453
Aug.	...	647	654	560	458
Sept.	...	641	652	565	502
Oct.	...	635	646	568	545
Nov.	...	632	645	577	561
Dec.	...	633	646	585	563

Doing a Bigger -WITH

BY RADIO, bill insert, magazine and newspaper advertisements the Bell system is appealing for public co-operation in its effort to maintain an efficient telephone service at the disposal of war agencies. In certain areas, installation of new service or additional equipment can be made only within definite limitations.

On all calls, the public is being urged to remember that "telephone highways are overcrowded," that "war calls come first."

The object, of course, is the conservation of materials now urgently needed for war which might otherwise go into expanded telephone plant.

The conservation of metals and materials is no new story to the Bell system. Principles of thrift in the use of materials have long affected the manufacturing operations of the Western Electric Co., the Bell system's organization of manufacture and supply, and the day-to-day practices of the operating companies.

Down through the years Bell system engineers have been engaged in a continuing search for metals and materials which—for reasons of efficiency and economy—might replace others used in telephone manufacture. Today this same corps of engineers has mobilized its talents and experience for a wartime search for alternatives to replace materials normally used in telephone manufacture, but which the insatiable demands of the war machine have rendered scarce.

For decades one of the principal functions of Western Electric's distributing houses has been the repair and reconditioning of used equipment for return to service. Today, with fewer and fewer new telephones leaving the assembly line, this activity has become more important than ever before.

Machine scrap and rejected parts from Western Electric's manufacturing operations, as well as junked telephone equipment, have long found their way, in the normal course, to reclamation furnaces to be melted down and recast as pigs and ingots of reborn metal to feed once again the assembly lines of its Hawthorne, Kearny and Point Breeze works. War conditions have focused attention on scrap and junk as important reservoirs of essential metals, while principles of grading and segregation adopted by Western Electric many years ago as vital to successful reclamation are now being adopted throughout industry.

Supplementing these measures, the Bell Telephone Laboratories have turned up new telephone techniques, devised primarily in the interests of improved service, but which incidentally permit expansion of facilities with a minimum expenditure of metals—an "incidentally" that has become mighty important today. Thus, although carrier telephony was introduced into the telephone system some years ago, the Bell system's 1942 long lines expansion program features more prominently than ever before this technique to make less metal do more work.

In 1942 these conservation measures have been geared to war conditions—all in the interests of keeping the telephone system at the highest level of efficiency consistent with the most efficient prosecution of the war effort.

Alternative Materials: To meet the expanding equipment requirements of the nation's telephone network would normally involve vast expenditures of the very metals and materials now going into munitions manufacture. But Bell engineers saw the pinch coming, in pre-Pearl Harbor days applied their group knowledge of the characteristics of materials to the job of finding replacements to release as much vital material as possible from telephone manufacture.

Ever since shortages first threatened, new materials have—after test and trial—been introduced into manufacturing procedure as part of a continuing, cumulative effort. And although telephone production was expected to drop this year, measures to save as much vital material as possible in the manufacture of each piece of equipment were promptly put into effect.

Alternatives introduced in the manufacture of the combined telephone set, for instance, have released hundreds of tons of essential metals and other materials for war use. Combined sets used to be made of an alloy composed of about 4 per cent aluminum, 0.05 per cent magnesium, and 95 plus per cent zinc—all indispensable metals to a nation with a war to win. As an interim measure in the interests of saving aluminum and magnesium, the alloy's composition was changed to: 2 per cent aluminum, 1 copper, 0.015 magnesium, and the rest zinc.

Meanwhile, however, production of plastic combined set housings had begun, and by August, 1941, one-third of combined set production had been converted to the plastic molding process. By February, 1942, conversion was complete, and combined set production, although running at a reduced rate, was 100 per cent plastic. Since its introduc-

By ALVIN von AUW
Information Supervisor
Information Department
Western Electric Co. Inc.
New York

Job LESS

Opposite page—Feeding scrap to baler. When identification by marking or color code is not feasible, sorting is accomplished by referring to the master board containing samples of punch press skeletons seen at the left

Left, above—A Western Electric employe at the Atlanta distributing house repairs subscriber sets so they may be returned to service at peak efficiency, thus easing demand for telephone equipment in an area booming with war activity

Directly above—Baled nonferrous scrap is charged into an electric induction melting furnace for reclamation at Chicago Hawthorne Works of Western Electric

tion the conversion to the plastic process has realized a saving in zinc alone of about 2,000,000 pounds.

The program has also effected changes in the composition of scores of the more than 300 separate parts that make up the modern telephone set. Instead of aluminum, steel now goes into the dial finger wheel—saving to date: 128,000 pounds of aluminum. Steel supplants aluminum, too, in receiver and transmitter grids, while ceramic substitutes for aluminum in the transmitter barrier.

But before you begin to count the savings realized by the changes in combined-set specifications, remember that the telephone set itself represents but 10 per cent or less of the total physical plant of the telephone system and that combined set manufacture, therefore, represents but a proportionate percentage of Western Electric manufacture for the Bell system. The total savings effected by the introduction of alternatives in literally thousands of places throughout the full roster of W. E. telephone products run to really impressive totals.

Take copper, for instance. Copper-steel is now being used instead of bronze in drop wire, of which many millions of feet are used each year. The savings in copper effected by this change—in force since February—amount to 850,000 pounds. Another 900,000 pounds of copper has been saved by using copper-steel instead of copper for line wire.

Now look at aluminum. Upon completion of a few changes that are still in process, alternatives will have been introduced for practically all of the many telephonic uses of aluminum except in condenser foil, for which, it appears, no less-scarce material can substitute satisfactorily.

Rubber stands high in the list of scarce materials essential to the war effort; stands high, too, in Western Electric's program of alternatives. Combined sets of recent manufacture, for instance, contain not a milligram of rubber. Impregnated fiber has replaced the rubber formerly used on the receiver cords, while felt pads made from reclaimed wool have supplanted rubber non-skid pads on the base of the instrument.

The condenser within the set is now

(*Please turn to Page* 104)

Licking the Gaging

. . . . in the mass production of Rolls Royce aircraft engines at Packard Motor Car Co.

BELIEVE it or not! The more than 11,000 component parts of the Packard-built Rolls-Royce aircraft engine necessitate some 46,522 gaging operations and require the use of approximately 75,000 close-limit gages of almost all conceivable varieties. This is the engine that powers such fighters and bombers as the RAF Spitfire, Lancaster and the AAF Curtis P-40F.

To meet precisely the intricate and critical responsibilities of complete gaging control, W. H. Baker, chief inspector, Packard Motor Car Co. Aircraft Division, has set up an unusually effective central tool-and-gage inspection system. It might serve as a model for a nation-wide system to provide pooling of gages and their interchange.

The tool-and-gaging problem is serious. Manufacturers wait from six months to a year for certain types of gages. By its centralized control, however, Packard has increased gage life over 900 per cent —in fact, Packard gages do not wear out, they wear in. This plant makes over 5000 gage inspections per day without at all interfering with production, as will be described, and with a saving from scrap that is almost incalculable.

Gaging cylindrical fits is one of the most important operations in the mechanical field. It is deplorable that under present conditions and with American industry working as one great world arsenal it has available only a national standard on cylindrical fits that was deemed to call for revision as far back as 1930, yet such revision has not been undertaken so far.

Committees of American Standards Association, American Gage Design and the American Society of Tool Engineers are all working on such standardization. Packard has achieved it due to the efforts of Mr. Baker and his staff. This company's practical experience includes inspecting well over 500,000 gages to date. There is no gage inspection job more exacting and complicated in all war industry than this Rolls-Royce motor, the fineness of whose manufacture and the precision of whose parts makes watch-making look crude at many points.

D. W. Varel is foreman in charge of the Record and Procedure Section of Packard's inspection department. Associated with him on standardization of control is F. L. Armstrong. Some idea of the inspection burden is indicated in the fact that the ratio of inspectors to production workers at Packard is approximately one to four. But, before ex-

Fig. 1—Limits are so close that "work" gages are used to supplement inspection gages

Fig. 2—The McCaskey register system is employed to keep life history and location of every gage and tool in the plant. Each tool crib has a layout similar to the one shown here

Fig. 3—Girl "runners" from the central gage procurement center pick up gages for periodic inspection. Here machinist receives receipt for gage girl has just picked up from his station. Under her arm is a list of gages to be picked up for the day. Especially designed carts are used to transfer gages in the plant

Fig. 4—Intricate fixture is being checked by production tryout in receiving tool inspection department

Fig. 5—This is the section in the Packard aircraft laboratory where master gages are checked against gage blocks and other standards using optical flats and light rays for extreme precision. Room has temperature and humidity under close automatic control by special air conditioning equipment

Job

by G. ELDRIDGE STEDMAN

amining details of inspection, let's take a look at Packard activities.

Back in 1914, Packard designed a liquid-cooled aircraft engine. These were supplied to the United States Navy until the Lindbergh flight tended to throw favor to air-cooled motors. Gar Wood's interest in motorboat racing caused the conversion of the Packard aircraft engine to marine purposes. With it, Gar Wood established the 124.9 miles per hour record that brought him the Harmsworth trophy and a world's record. In 1938, Packard suggested that this motor be redesigned for PT boats. Fast on the trigger, the Navy helped step up this motor to an increase of 60 per cent in horsepower without materially increasing the weight, speed and maneuverability in relation to weight being crucial requirements in powering these swift-striking mosquito boats. Thus Packard's 28 years' experience in liquid-cooled engines enabled it to power PT boats from the beginning, first deliveries being made within 5½ months after contract. These are now being supplied to United States and Allied navies.

It may not be known generally that Packard originated the method or progressive assembly in aircraft engine production. Now almost every possible process movement in Packard's huge

Fig. 6—An amazing thing—few workers realized the dollars-and-cents value of the gages they used. A carefully worked out campaign to emphasize the value of gages resulted in a 25 per cent reduction in gage losses, according to figures from records being examined here by W. H. Baker, chief inspector, Packard Aircraft Division, (left) and D. W. Varel, foreman in charge of Record and Procedure Section

plant is on conveyors. Conveyor systems are everywhere, being used even in final inspection of finished parts.

In September, 1940, Packard was approached by the United States and British governments to build the Rolls-Royce engine. Theretofore, this famed power plant had been built by slow, painstaking methods. Yet within 10 months Packard put the Rolls-Royce into production on an assembly line. Lately, England has gone part of the way in progressive assembly.

Packard makes over 2000 of the major Rolls-Royce engine parts, is making more all the while. It was necessary to design, build or order more than 3400 special machine tools for this setup, which require three large new buildings and the layout of miles of conveyor systems among other things. Production is expected to double within the next year. Packard is now replacing drafted men with women, expecting to reach a 30 to 40 per cent level of feminine employment at peak.

Each Packard-built aircraft engine carries a case history record with it as it progresses along assembly lines. Starting with the crankcase, assembly moves progressively through such main processes as installation of crankshaft and rods (every stud is torqued to a specified inch poundage); reduction gear assembly (unusual fixtures are used to eliminate such hazards as that of the rods' nicking the cylinder edges); piston assembly; complete cylinder bank installation (here again, fixtures show unusual care); gear case installation; valve mechanism assembly; the subassembly of the supercharger carburetor.

After truing and setting of controls, completely assembled engines are weighed in. Engine weight is held within 10 pounds. After flush-in, the engine is given a 5-hour "green" run. Thereafter it is completely torn down and reassembled on a reverse assembly line—another Packard innovation. Finally, after final run inspection, it is crated for shipping.

Cradled in the special holding fixtures of its shipping crate, moisture plugs set in to signal danger points during its passage, enveloped in pliofilm, hermetically sealed . . . just before being covered in its huge shipping case this Packard-built Rolls-Royce looks for all the world like a beautifully wrapped Christmas present—full of Hell for Hitler.

All along the assembly lines, thousands of parts are placed in orderly installation. Craftsmen on the line comment: "We couldn't do anything less than our best if we wanted to . . . the excellence of these parts must be matched by the excellence of our work." It requires 77 times the number of standard hours to build a Rolls-Royce as is required for a standard automobile engine. For example, 67 standard hours and 138 operations are required to machine the crankshaft of the aircraft engine, compared to 3.3 hours for the standard Packard 8-cylinder engine crankshaft.

Its tool engineering department has worked out thousands of specially designed gages and gage fixtures, and much use is made of indicator gages. Inspection involves many complicated tests. The calibration of scales and gages in the engine testing stands and their periodic reference checking includes such items as dynamometer, oil and fuel manometers, thermocouples, thermometers, pressure gages, inclinometers. It is awesome in its precisional caution.

There are many dramatic tests scattered along the subassembly lines—such as that of the impeller which in a booth fixture is spun over 25,000 revolutions per minute, and readings taken by the cathode ray oscillograph to check centrifugal balance. Bearings are spun in a soundproof room to 25,000 revolutions per minute for a vibration check. Then, throughout the plant, Magnaflux inspection is employed extensively to check the degree, frequency and location of surface and subsurface defects such as quenching and thermal cracks, seam defects and grinding checks, cracks in nitriding cases, forging laps, and the like.

Of necessity, Packard was forced to develop its own standards of inspection control. For this reason it is doing an exceptional job in the gaging control of close limit manufacturing—the precision so vital to mass production of today's aircraft engines.

All inspection gages and special tools, jigs and fixtures are co-ordintaed in a Central Tool and Gage Inspection Department which controls the receiving, periodic use inspection and repair of all gages. A history card is given to each incoming gage. This stays with it wherever it goes as the gage is automatically recalled at set intervals for inspection, repair, redistribution. Although the inspection department maintains complete control of receiving, we shall focus attention on the central gage inspection procedure. This occurs after the gage has been received and passed for use.

Since any gage represents the extreme

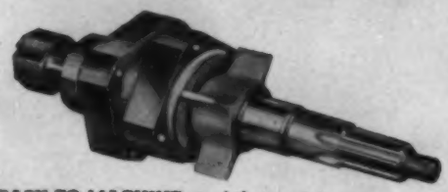
TABLE I—Typical Gage Wear Allowance

Class	Part Tolerance, Inch	*GO* Nib, Inch	*NOT GO* Nib, Inch
A	.00025 to .001	Nominal to —.00005	Nominal to —.000025
B	.0011 to .002	—.00006 to —.0001	—.00003 to —.00005
C	.0021 to .004	—.00011 to —.0002	—.00006 to —.0001
D	.0041 to .0075	—.00025 to —.00045	—.00015 to —.0002
E	.0076 to .010	—.0003 to —.00075	—.00025 to —.00035

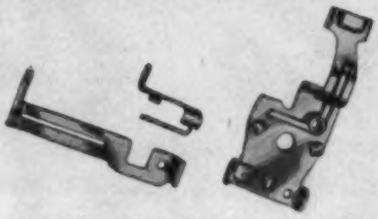
to help you find the key

to Faster Production of Stainless Parts

. . . and Reduce Your Stainless Steel Scrap Loss



EASY-TO-MACHINE steel that resists corrosion is needed for making magneto shafts . . . a difficult production job made easy by Carpenter Free-Machining Stainless.



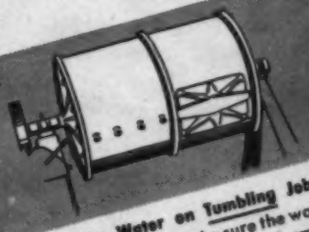
SEVERE BENDING with or against the grain is no problem when switch parts like these are made from soft and ductile Carpenter Stainless Strip.

NO PROCESS ANNEALING on this difficult deep drawing job, thanks to the ductility of Carpenter Stainless Strip.

Let Carpenter help you check *all along the line* to increase output and reduce your Stainless Steel scrap loss. For example, would a press speed *reduction* of 10 to 15% increase output by cutting rejects due to die galling and similar difficulties?

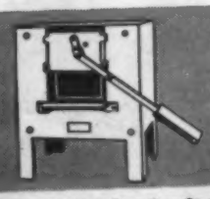
To help you size up your production operations, we offer a few of the practical suggestions collected by Carpenter men who have spent a good part of their lives solving Stainless problems. Among these suggestions may be an idea you and your men can put to work.

And remember—your nearby Carpenter representative is ready to help you lick your stubborn fabricating problems. He can give you first hand assistance, and keep you in touch with our Metallurgical Department. If you find the going tough, call on him.



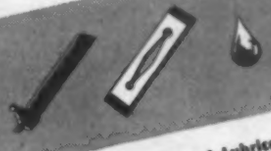
Check the Water on Tumbling Jobs!

On tumbling jobs, make sure the water used is "soft". Hard water forms a lime soap, impossible to remove. Balls so coated do not impart a satisfactory finish to the work. Reduce hard water to "soft" water before charging the barrel. This is done by adding 1 oz. of trisodium phosphate per grain of hardness per 100 gals. of water. Your water company can tell you the grains of hardness per gallon of your water.



Annealing and Heat Treating Stainless?

Anneal all Stainless forgings—whether they are air hardened or not. Do not pack Stainless Steels in a carburizing compound as resulting surfaces will be inferior in corrosion resistance. And when hardening Stainless Steels by heat treatment, it is generally a good rule to soak pieces at least 20 minutes per inch of thickness after bringing them uniformly up to heat. After hardening, the steel should be drawn back to get the hardness, strength and toughness desired.



How About Tool Steels and Lubricants?

Are your tools and dies made of the correct steel for each job? Re-stoning of dies and regrinding of tools is costly in shut-down time. Frequently, an analysis of your tool, die and lubricant set-up will point the way to getting rid of production "bugs". A complete review of procedure may help boost output and conserve much-needed metals.

The Carpenter Steel Company
139 Bern Street • Reading, Penna.

USE THIS Carpenter Working Data Book to help you get more production, fewer rejects, from every pound of Stainless Steel. Use it to help you plan the development of your post-war products. A note on your company letterhead is all that is needed to start this book on its way, anywhere in the U. S. A.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

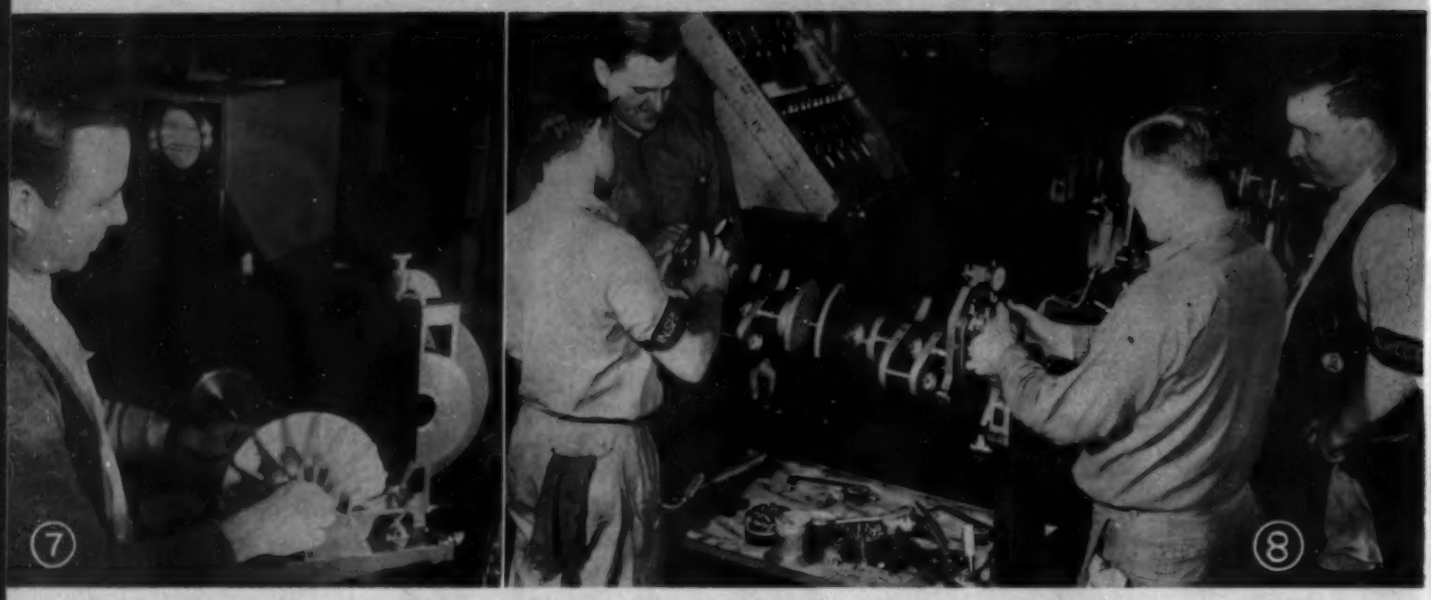


Fig. 7—Supercharger impellor is revolved at more than 25,000 revolutions per minute and any unbalance revealed by the sensitive cathode ray oscillograph

Fig. 8—Inspector at left is using dial indicator gage to check exact stretch of connecting rod bolts which must be held within 0.004-inch. Inspector at right is checking clearance of connecting rod bearings on crankshaft journal to within 0.0015-inch

limits of the part being produced, the gage's condition is most crucial if perfect interchangeability is to be obtained and if scrap, lost machine and assembly time are to be avoided. Opposed to previous theory is the definition issued by Mr. Baker on August 20, 1942, after procedure had been thoroughly placed in practice: "We believe that wear allowance is a factor of the individual gage and should be set in each instance at the time of engineering design and processing." Even the different gages under a given tool number are, by this policy, considered and treated individually. With 5000 gages being inspected each day . . . some job!

"Our first step," Mr. Varel explains, "is to provide a permanent history card to the gage, covering every pertinent life detail. Tool engineering, inspection, processing departments first must agree upon the necessity for the gage, upon adequacy of design. They set maximum wear allowance per individual gage, basing this upon tolerance, minimum clearance and the part factors involved. This wear allowance is entered upon the permanent history card along with the frequency that inspection will be required.

"These history cards are filed chronologically. Three days before its 'inspection due' date, each individual gage is automatically listed on the Gage Pickup Sheet that is sent to the department foreman using the gage, who releases it for centralized inspection at the time specified. Or he may set another time within 24 hours when it can be inspected without interference with production in his department. It must be checked within 24 hours of the 'inspection due' date. Sometimes the inspection is made on the production floor if that particular gage cannot be released to central inspection without lost-time penalties.

"Since gages are used by different men on different shifts, their exact location must be determined in advance of the time of pick-up. This is done by submitting the Gage Pickup Lists for check against McCaskey records maintained in the tool cribs. At the specified time, the individual gage is picked up by a 'runner' directly from the job. It is then inspected at the central inspection department and returned to the job. If it is defective but capable of repair, the operator is notified. When repaired, it is returned. Each department foreman is given a copy of all defective tool reports, showing the 'offage' of the repair. This allows him to recheck parts recently passed by in using that gage.

"At the time of inspection the inspector enters on the history cards the exact dimensions to which the gage was checked so that subsequent inspectors can estimate the progressive rate of wear. As wear increases toward the fixed limit, the interval between inspections is shortened, and Tool Stores is advised so that it can plan repair or replacement."

Mr. Varel says that nothing like this gage inspection control has ever before been required. With 5000 individual inspections per day, the uniqueness of the system can be visioned.

In the central Gage Inspection Department, the runners deliver the incoming gages, along with history cards and blue-prints, on disposition tables, where they are classified by the inspection leaders into five groups: (1) Fixtures, gages, flush pin gages and general plate layout; (2) snap gages and setting of adjustable snaps; (3) cylindrical plug gages; (4) thread gages, cylindrical and ring; (5) those to be checked on a J & L comparator including threads, templets, profile gages, etc.

It is interesting to see how the Packard policy of gage design, use and maintenance differs from conventional practice. For example, the *American Tentative Standard, Tolerance, Allowances and Gages for Metal Fits—B4a-1925* assumes as a major premise that *GO* gages must be held to nominal size while *NOT GO* gages may be given wear allowances. Packard experience is that since wear of *NOT GO* gages cuts into working tolerance by rejecting good pieces within blueprint limits, they must be held dead. Virtually no wear is allowable.

On the other hand, wear allowed on *GO* members increases working tolerances and is permissible. But it must be allowed with reference to the minimum mating clearance on which it encroaches. This is opposed to the standard theory which allows wear as a percentage of part tolerance without regard to the vital consideration of minimum clearance. Mr. Varel comments, "The fallacy is obvious."

By its procedure, Packard has been able to increase gage life better than 900 per cent. Since wear allowance is a factor of the individual gage, it is set in each instance at the time of en-

(*Please turn to Page* 98)

Even the Gals can run a PORTER FIRELESS!

It's no trick at all to operate a Porter Fireless Locomotive. Put an untrained woman war-worker at the throttle and she'll be switching 'em like a veteran in no time at all.

That's really something in these days of manpower shortage, but that isn't all: Porter Fireless Locomotives cost less to buy, less to operate and less to maintain. They last longer—the first Porter Fireless is still operating after 29 years of service. There are no fumes or dirt, and a soft exhaust is the only noise.

Since the Porter Fireless has no firebox, there is no fire hazard—steam is charged into the locomotive's reservoir at 85 pounds, from any available source about the plant. A boiler explosion is impossible. Charging can be done in about 30 minutes during an idle period and no week-end attention is required. If you are interested in saving up to 50% in your haulage costs, write for illustrated folder describing the Porter Fireless.

ARMY E NAVY

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ONLY **PORTER** BUILDS A *COMPLETE* LINE OF LOCOMOTIVES FOR INDUSTRY

Arc welding puts together the frame for a huge electric motor, saving vital time in making available quickly the power that will be developed by this unit. General Electric photo

Larger Electrodes

. . . . cut welding costs as much as 60 per cent, increase output 200 per cent

USE OF larger electrodes in arc welding is giving new impetus to war production in many factories and shipyards throughout the United States. In many instances, welding operations vital to this country's war effort have been speeded up as much as 50 per cent by the use of electrodes of one or two sizes larger. In one instance, the increased speed amounted to 200 per cent, accomplished with the aid of improved jigs and fixtures.

Many such instances were revealed recently as a result of a nation wide survey conducted by the Lincoln Electric Co., Cleveland. The survey was made to determine the response of users of arc welding to the appeal that welders use larger electrodes in the interest of the war effort as well as efficiency.

Robert Proctor, chief engineer, Commercial Shearing & Stamping Co., Youngstown, O., said that some of the company's arc welding methods, including the use of larger electrodes, helped it recently to win the Army and Navy "E" award for production. Use of larger electrodes increased welding speed from 40 to 55 per cent at this plant.

"The use of the largest electrodes possible for each type of fabricated job is imperative if maximum production is to be obtained," said Mr. Proctor. For example, a ⅜-inch fillet weld on ½-inch mild steel plate formerly welded with ¼-inch electrode at 40 feet per hour (arc time) is now done with ⅜-inch electrode at 95 feet per hour. This increased our arc-time efficiency from 40 per cent with ¼-inch rod to 55 per cent with ⅜-inch electrode.

A ¼-inch fillet on a 3/16-inch plate, formerly welded with a 3/16-inch electrode at 8 inches per minute (arc time), can be accomplished with ¼-inch rod at 14 inches per minute. By proper handling of the electrode, these larger sizes give excellent results even though the first attempts often appear discouraging.

Experimenting with larger electrodes, some concerns found that they can be used on thinner metal than they had previously suspected. The 3/16 and ¼-inch electrodes were found being used successfully on metals as light as ⅛-inch in thickness.

Use of larger electrodes also has a tendency to cut down the number of passes required to make a joint. In many instances, learners on welding jobs are able to do satisfactory work in shorter apprenticeship time, manufacturers have discovered.

The highest increase in welding speed —200 per cent—was reported by a manufacturer of belt reels. This increase occurred in shifting from 1.8 to 5/32-inch electrodes and improving the setup of the welding job.

Savings in cost ranged upward to 60 per cent, which was reported by a pipe manufacturer. A company making tractor idler rollers reported a 50 per cent saving.

An analysis of savings achieved in its plant was made by the Electric Machinery Mfg. Co., Minneapolis, Minn. Welding stator frames in a horizontal position with 3/16-inch "Fleetweld 7" electrodes required three passes. When a

(*Please turn to Page* 94)

By A. F. DAVIS
Vice President
Lincoln Electric Co.
Cleveland

Photo Courtesy International Business Machines

Modern inspection by optical projection saves time and money

Jones & Lamson Comparators are available in Pedestal, Bench and other types to meet every need in the field of Inspection by Optical Projection. We shall be pleased to study your problems and apply to them the accumulated experience of more than twenty years in this field.

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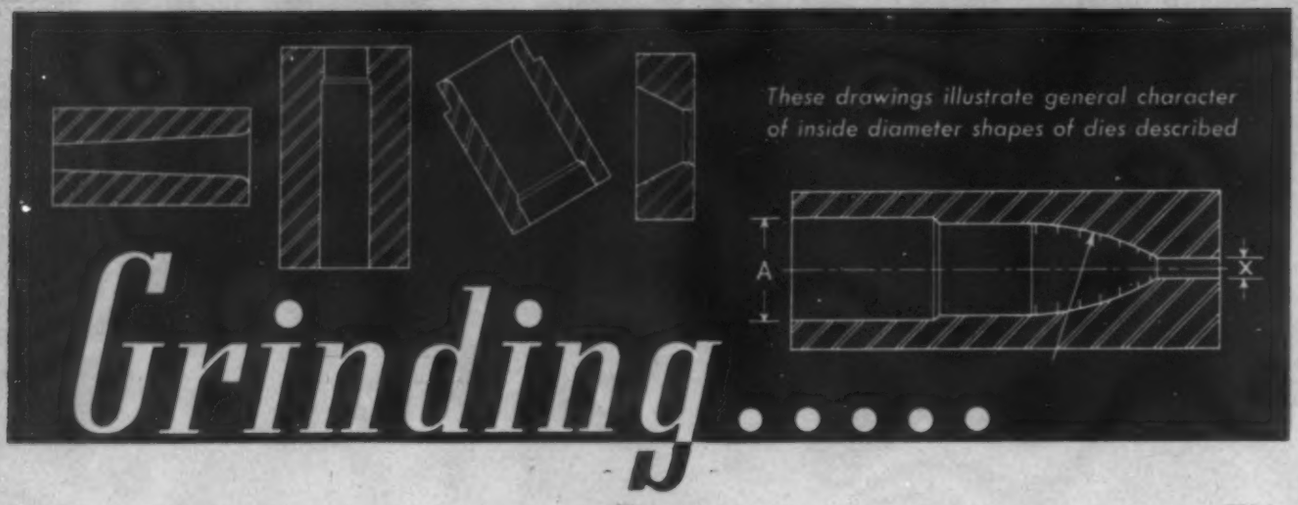


Grinding.....

CARTRIDGE CASE AND BULLET JACKET DIES

With most small die shops in the New England area and elsewhere reported working on dies for production of cartridge cases and bullet jackets, these observations of a grinding engineer long associated with operations involved in this work may be timely. Comments also apply to other tungsten tool steels in the 3½ to 5 per cent range

By FRANK B. WHITTEMORE JR.
Norton Co.
Worcester, Mass.

CARTRIDGE cases and bullet jackets are products of drawing operations. The problem of producing dies in quantities large enough to keep up with the tremendous production requirements has become a critical one. From the beginning, there has been an urgent need for dies capable of producing many more draws than could be obtained from the high-carbon steel dies formerly used. The necessity for conserving critical die steels has been a more recent consideration.

Tool steels with a tungsten range of 3½ to 5 per cent are proving to be an answer to this problem. Dies made from these steels have greater resistance to wear and require fewer reconditionings, with the result that a fewer number of dies are required for a given output of cartridge cases or bullet jackets. One of the properties which makes these tungsten steels particularly suited for drawing dies is their tendency to shrink in hardening. In fact, they frequently can be shrunk enough by rehardening to compensate for wear, thus allowing them to be reused for the same size die.

In order to meet the great demand for cartridge case and bullet jacket dies, numerous machine shops, small and large, throughout the country have been given contracts to manufacture these dies. Following is a brief summary of our observations and experiences in the field, particularly as related to the grinding and lapping operations.

Cutting to Length: In most cases the manufacturer receives his die steel in the form of bar stock. The first operation, then, is to cut this material roughly to length. This is being done in a number of different ways and ordinarily does not offer any trouble. In some plants lathes equipped with cut-off tools are being used, while in others abrasive cut-off wheels have been found to be the more economical medium, particularly on smaller size bars. Multiple saw machines are probably the most popular.

The cartridge die manufacturer should remember the importance of keeping such cutting tools sharp, as only then will they produce smooth ends and reduce to a minimum the amount of stock that must be ground off the ends in later operations.

The Norton research laboratory has recently completed some tests which indicate that tungsten steel bar stock as used for drawing dies can be rapidly and economically cut into sections with a Norton 46-M8T Alundum resinoid cut-off wheel. This wheel should be operated at approximately 10,000 surface feet per minute, either wet or dry.

Machining Outside Diameter: After the bar stock has been cut to length, the outside diameter must be reduced to approximate size. This is an ordinary lathe operation and should not give any trouble. The truing tool should be accurately ground to insure rapid stock removal and good finish and thereby facilitate the grinding operation to follow. After turning the outside diameter the next step in manufacturing the drawing dies is to form the hole. For the sake of clearness the straight and tapered hole dies will be discussed apart from the contour dies.

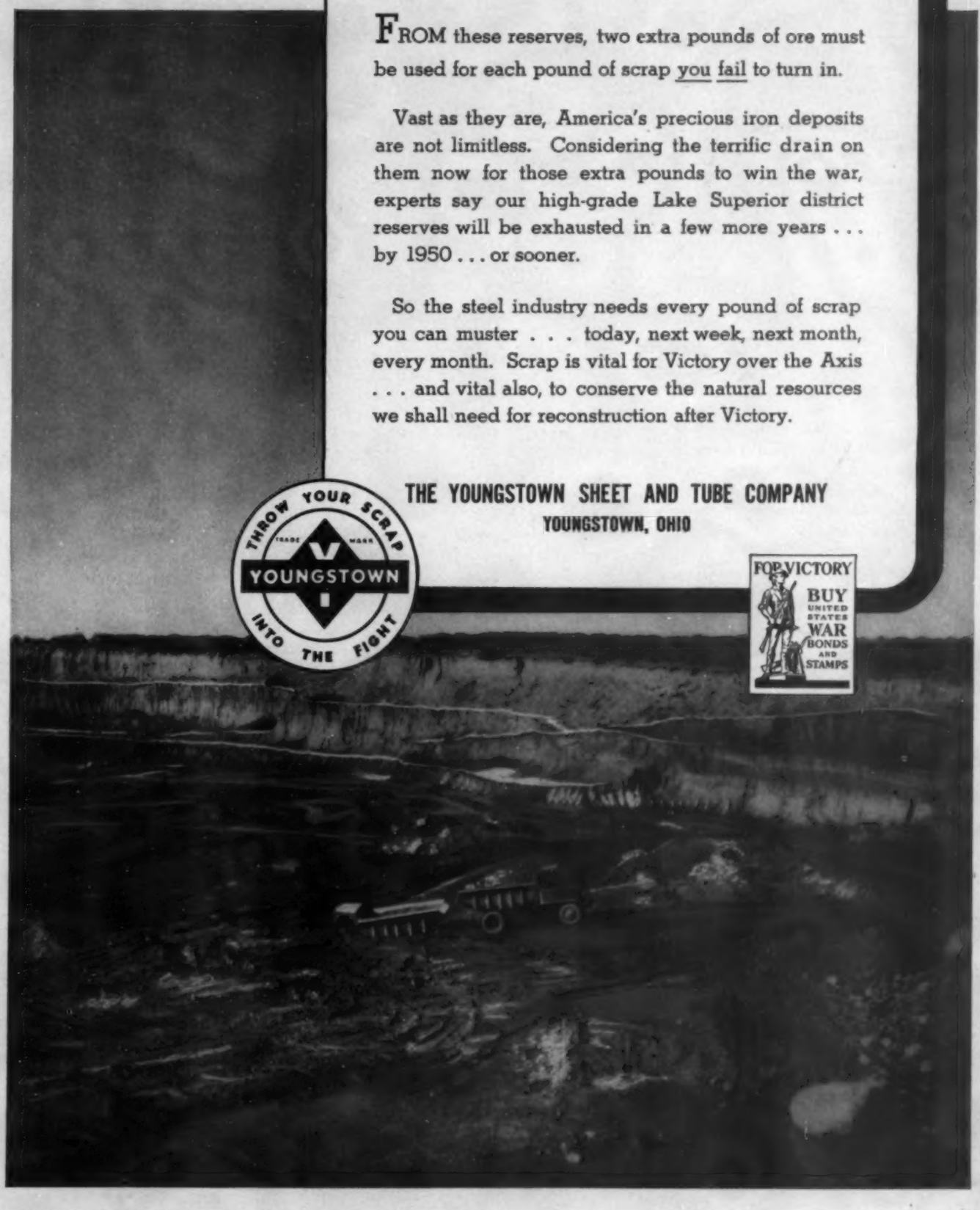
Drilling Straight and Tapered-Hole Dies: While this operation does not usually give any trouble, a few suggestions may be helpful. Generally speaking, fairly high speeds and light feeds are best when drilling the 3½ to 5 per cent tungsten steels. A heavy flow of cutting oil is recommended. If the die is to be of the deep-hole type, an oil hole drill might be used to good advantage. Of course, the work should be held rigidly and the hole "spotted" to insure straightness.

Some plants follow up the drilling operation with reaming, while others bore the hole approximately to size, leaving only enough stock to clean up by grinding and lapping after heat treating. Tools for boring dies must be accurately made, rigidly held, and used in a machine where vibration has been eliminated and which provides proper speeds and feeds. Only where these conditions are met can satisfactory results be obtained. In some plants it is the practice to employ two boring operations on long-hole straight and tapered dies. The dies are first rough bored and then finish bored to obtain the desired accuracy and surface finish.

Drilling Contour Dies for Bullet Jackets: Methods of drilling so-called contour dies vary somewhat from one shop to another according to the shape of the die and the equipment available. The bullet jacket die illustrated may be considered representative of the common types of contour bullet jacket dies.

(*Please turn to Page* 96)

YOUR *Scrap* CAN POSTPONE 1950



FROM these reserves, two extra pounds of ore must be used for each pound of scrap you fail to turn in.

Vast as they are, America's precious iron deposits are not limitless. Considering the terrific drain on them now for those extra pounds to win the war, experts say our high-grade Lake Superior district reserves will be exhausted in a few more years . . . by 1950 . . . or sooner.

So the steel industry needs every pound of scrap you can muster . . . today, next week, next month, every month. Scrap is vital for Victory over the Axis . . . and vital also, to conserve the natural resources we shall need for reconstruction after Victory.

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FOR VICTORY
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How To Use the . . . .

NE (National Emergency) ALLOY STEELS

. . . . with information on the end-quench test, procedure involved and its application

WHEN the United States entered the present war an unprecedented demand was placed upon the nation's steel producing facilities. It was immediately evident that to meet this demand the industry would have to strip for action by removing every impediment to maximum production.

There was already in sight a possible shortage of certain alloying elements and a definite shortage of uncontaminated scrap, especially in alloy steel producing districts. The War Production Board and their predecessors recognized these conditions and appointed groups familiar with them to work out their solution. The duty of one such group was, first, to develop the absolute minimum number of constructional alloy steel analysis that would satisfactorily cover the field; second, to conserve alloys by combining them in small amounts so as to give maximum results per unit used; third, to utilize to the fullest the alloy residuals in available scrap.

With these objectives in mind, the original sixteen NE steel analyses were written. The next step was to prove the tentative analyses on small experimental heats and later to make full production heats. In developing the NE steels considerable dependence was placed on the end-quenched hardenability test, also known as the Jominy or G.M.C. test.

End-Quenched Hardenability Test: This test is based on the concept that the hardening of steel by quenching is a function of heat extraction. Generally speaking, rapid heat extraction results in high hardness, and slow heat extraction results in low hardness. For a given analysis, each rate of heat extraction or rate of cooling has a corresponding hardness. The cooling rate diminishes from surface to center of massive parts and hardness diminishes accordingly.

With a given carbon content, alloy permits higher hardness in the lower cooling rate brackets. Therefore, the effect of the lower cooling rate of the center of massive parts can be partially offset of the use of alloy.

Cooling rate and hardness are one and the same so far as interpretation of the end-quench test is concerned. Cooling rate is the cause; hardness is the effect. The hardness resulting from cooling rates at various levels below the surface of parts can be consistently correlated with points on the end quench specimen. Because hardness and physical properties are so closely related, hereafter we will deal with hardness only. The first requisite in obtaining the full physical properties of steel is full hardness.

Fig. 3 shows the standard end-quenched test bar which is normalized or annealed and turned to 1-inch round by approximately 3⅞ inches long. It has a 1⅛-inch diameter head at one end which permits hanging the specimen vertically in a fixture for quenching. The specimen is heated to the proper temperature and placed in the fixture as shown in Fig. 3 with the 1-inch round end over a water outlet. The water is then turned on by a quick acting

For information on development of NE steels and their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41, p. 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 9, p. 96; Dec. 28, p. 27; Jan. 25, 1943, p. 84; Feb. 22, p. 102; March 1, p. 94; March 15, p. 94.

For reports from users of NE steels, see Nov. 16, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p. 99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66; Feb. 1, p. 100; March 8, p. 109; March 15, p. 96.

For latest revised list of NE alloy steels, see STEEL, March 1, p. 94.

For list of AMS (Aircraft Materials Specification) steels, see Sept. 7, p. 78.

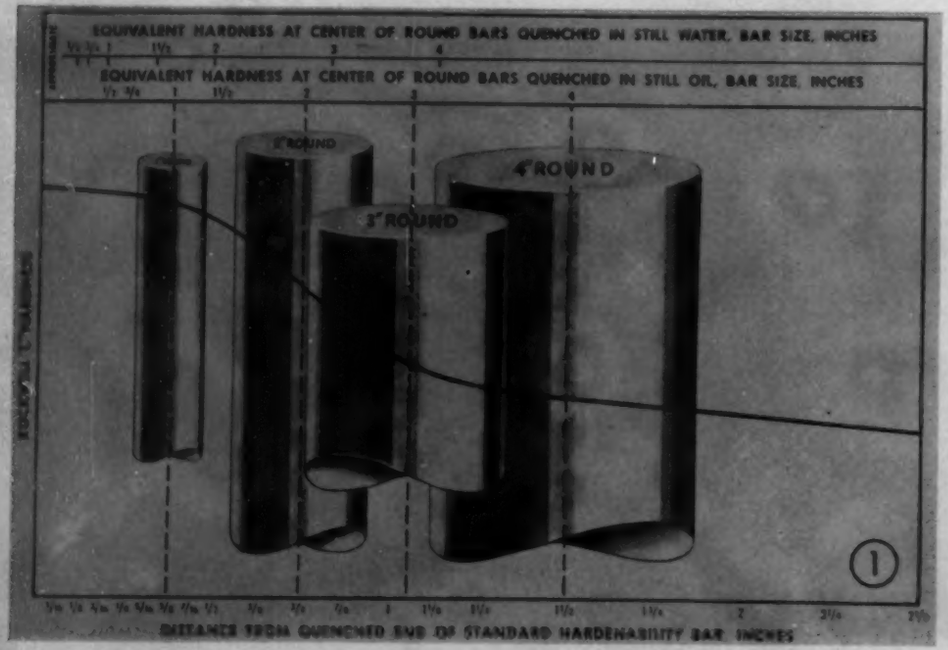
For details of WD (War Department) steels and complete listing, see Feb. 8, 1943, p. 80.

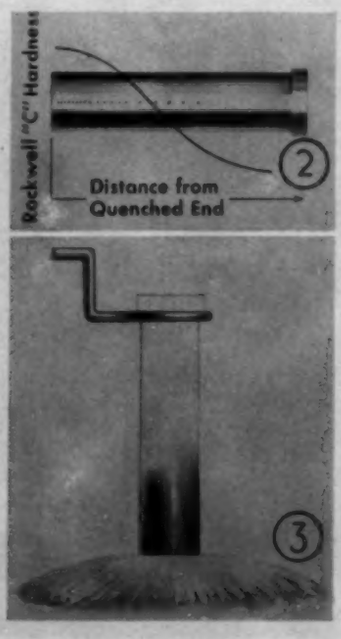
For list of NE carbon steels see STEEL, March 8, p. 90.

From *National Emergency Steels*, published by Republic Steel Corp., Cleveland.

Fig. 1—Equivalent hardness at center of rounds. Fig. 2—Jominy specimen after quenching, grinding and checking hardness. Superimposed curve shows how readings of hardness values vary with distance from quenched end of the specimen. This is the origin of the end-quench hardenability charts

Fig. 3—Jominy hardness test specimen being water quenched


EQUIVALENT HARDNESS AT CENTER OF ROUND BARS QUENCHED IN STILL WATER, BAR SIZE, INCHES
EQUIVALENT HARDNESS AT CENTER OF ROUND BARS QUENCHED IN STILL OIL, BAR SIZE, INCHES
2" ROUND
3" ROUND
4" ROUND
1
DISTANCE FROM QUENCHED END OF STANDARD HARDENABILITY BAR, INCHES



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ARMY E NAVY

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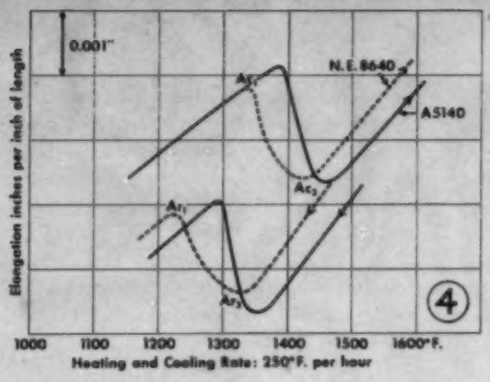


Fig. 4—Dilatometer curves of AISI A-5140 and NE-8640.

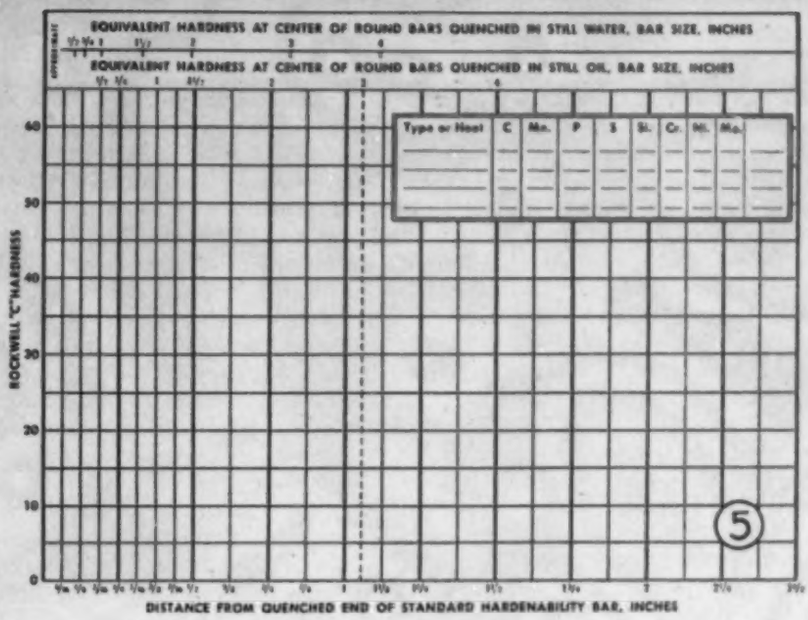


Fig. 5—Standard form for plotting end-quench hardenability curves

valve and the extreme end is water quenched.

After the specimen is cooled, it is prepared for hardness reading by grinding longitudinal flats on opposite sides. Rockwell readings are taken as shown in Fig. 2. The hardness is recorded by plotting valves on a chart as shown in Fig. 5.

Since only the end of the specimen is water quenched, it is obvious that the rate of cooling ¼ and ½-inch up from the quenched end is slower and results in a gradual falling off of hardness. In this diminishing hardness lies the chief value of the end-quench test, because somewhere along the length of the quenched specimen are points that represent practically every quenching condition from water to an air cool and from surface to center of various shapes and sizes. Consequently, any degree of hardness that may be encountered on or in a wide variety of parts made from a wide variety of analyses is represented somewhere along the length of this quenched specimen. See Fig. 1.

The cooling at ⅜, ¾, 1 1/16 and 1½ inches from the quenched end of the specimen results in hardness equivalent to that obtained at the center of 1, 2, 3 and 4-inch rounds respectively, when quenched in still oil.

Speaking in the simplest terms, to develop a new steel analysis to replace an old one requires that end-quenched tests be run from both analyses quenched from their optimum temperatures. The ideal condition would be attained if the end-quenched curve from the new analysis coincided exactly with that produced by the old one throughout the length of the specimen.

Thus to substitute one steel for another in a given part, the following steps are necessary:

First: Determine the cross section hardness of satisfactory finished and quenched parts, preferably undrawn.

Second: Develop an end-quench curve from the original steel and mark carefully the points on this curve where hardness equals that obtained from cross section of parts. In other words, find where the surface hardness of parts falls on the end-quench curve, also midway and core or other critical locations, and mark them plainly as key points.

Third: Select a substitute grade which has an end-quench curve that matches very closely the key points marked on the original curve as representing cross section hardness of original parts. To do this it is only necessary to determine what hardness is wanted, translate

TABLE I—Maximum Sizes For Cold Shearing

CARBON RANGE Per Cent	SIZES IN INCHES 2	2½	3	3½	4	SIZES IN INCHES 2	2½	3	3½	4
	TYPE AISI-2300					TYPE AISI-3000, 3100, 4000, NE-8000				
Up to 0.20	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
Over 0.20 to 0.25	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
Over 0.25 to 0.32	cs	cs	cs	cs	ha	cs	cs	cs	cs	ha
Over 0.32 to 0.40	cs	cs	cs	ha	ha	cs	cs	cs	ha	ha
Over 0.40 to 0.47	cs	cs	ha	ha	ha	cs	cs	ha	ha	ha
Over 0.47 to 0.55	cs	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.55		ha	ha	ha	ha	ha	ha	ha	ha	ha
	TYPES AISI-1300, 4100, NE-8200					TYPES AISI 4600, 5000, 5100 NE-8100, 8300, 8600, 8700, 9400				
Up to 0.20	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
Over 0.20 to 0.25	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
Over 0.25 to 0.32	cs	cs	cs	cs	ha	cs	cs	cs	ha	ha
Over 0.32 to 0.40	cs	cs	ha	ha	ha	cs	cs	ha	ha	ha
Over 0.40 to 0.47	cs	ha	ha	ha	ha	cs	ha	ha	ha	ha
Over 0.47 to 0.55	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.55	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
	TYPE AISI 6100					TYPE NE-8500				
Up to 0.20	cs	cs	cs	cs	cs	cs	cs	cs	ha	ha
Over 0.20 to 0.25	cs	cs	cs	cs	cs	cs	cs	ha	ha	ha
Over 0.25 to 0.32	cs	cs	cs	ha	ha	cs	ha	ha	ha	ha
Over 0.32 to 0.40	cs	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.40 to 0.47	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.47 to 0.55	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.55	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
	TYPE NE-8400, 9600					TYPE NE-8800				
Up to 0.20	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
Over 0.20 to 0.25	cs	cs	cs	cs	cs	cs	cs	cs	ha	ha
Over 0.25 to 0.32	cs	cs	ha	ha	ha	cs	cs	ha	ha	ha
Over 0.32 to 0.40	cs	ha	ha	ha	ha	cs	ha	ha	ha	ha
Over 0.40 to 0.47	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.47 to 0.55	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.55	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
	TYPES AISI-3200 and 4300 NE-8900, 9500					TYPES AISI 2500 and 4800				
Up to 0.20	cs	cs	cs	cs	ha	cs	cs	cs	cs	cs
Over 0.20 to 0.25	cs	cs	cs	ha	ha	cs	cs	cs	ha	ha
Over 0.25 to 0.32	cs	cs	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.32 to 0.40	cs	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.40 to 0.47	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.47 to 0.55	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
Over 0.55	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha

Note:
—Items marked "cs" can be cold sheared.
—Items marked "ha" should be sheared hot or sheared after annealing.
—This table can be applied to other types of steels when their hardenability is equivalent to those shown.
—Based upon blooms, billets or bars, cooled from rolling without reheating. Sizes given are rounds or squares, or sections of similar shape and cross-sectional area.

this into terms of the end-quench curve and then compare it with like curves obtained from those steels being considered as substitutes. All end-quench tests should be quenched from their optimum temperatures.

Take a simple example of a 2-inch round shaft made of SAE-3145 oil quenched with a minimum surface and a center hardness requirement of 50 and 40 rockwell C respectively before drawing.

First: Cross section hardness was checked on the shaft and revealed 53 rockwell C on the surface and 45 rockwell C in the center.

Second: An end-quench test was made from this material and 54 and 44 rockwell C fell at 5/16 and ¾ inches from quenched end respectively. The points 5/16 and ¾ inches from quenched end were chosen as key positions because hardness at these locations most closely matches the surface and center hardness found in the original shaft, and, considering the 50 and 40 rockwell C minimum requirement, this seems to be satisfactory. This hardness will be increased if the finished shaft is subjected to an agitated instead of a still quench.

The distances of 5/16 and ¾ inches from quenched end are now established as being the points on the end quenched specimen that correspond to the surface and center of a 2-inch round. Any analysis that matches the hardness obtained from original steel at these locations is acceptable as a substitute, so far as hardenability is considered.

Third: In reviewing several end-quenched curves produced from various analyses, one was found that gave 55 and 43 rockwell C at 5/16 and ¾ inches, respectively. This hardness is within one point rockwell C of that obtained from the original steel and is therefore considered satisfactory from a hardenability standpoint.

Many other examples of the end quenched test could be cited, but they would only confuse the preceding outline which contains all the information necessary to make any ordinary substitution up to the point of making and testing actual parts.

There has been some objection to the end-quench test because it employs water as the cooling medium. This should not be confused with water versus oil quenching of machine parts. Heat must be extracted from the end-quenched specimen rapidly enough to develop full hardness at its extreme end. The test bar hardness pattern must be broad enough to include all hardness ranges encountered in production regardless of section or quenching practice. A quenching medium less drastic than water would fall short of this on constructional alloy steel. In fact, water does not suffice for steels having very low or shallow hardenability. The L-type test bar was developed for such steels. It varies from the standard test bar in that it has no axial tapered bore in the quenched end running to a depth of about one inch. This bore provides relatively thin walls for quenching and, therefore, develops the full hardness pattern of the steel involved.

Another modification has been made to accommodate samples smaller than 1-inch in diameter. It consists of sealing a small test piece in an axial bore in the standard specimen. Otherwise, it is handled the same as the standard test.

Any of the preceding test pieces may be carburized and case characteristics studied at the various cooling rates if desired.

It should be mentioned that we are dealing with a hardenability test. Physical properties can only be predicted from it to whatever degree they are dependent upon hardenability. For example, impacts, transverse properties or burned steel can not be detected by the end-quench test any more than they can from any other hardenability test.

A few words relative to the preparation of the test piece and the correct procedure for conducting the end-quench test are in order.

—Water temperature should be held at 60 to 80 degrees Fahr.

—The test piece should be placed on a fixture so that a column of water may be directed squarely against the bottom face of the test piece. The column of water passing through an opening ½-inch in diameter should rise to a free height of 2½ inches above opening. This is equivalent to a flow of approximately 1 gallon per minute. The space between the top of the water outlet and bottom of the specimen when in position should be ½-inch.

—The quenched end of the test piece must be kept free of scale during heating. It is common practice to cover it with oily chips or spent carburizing compound.

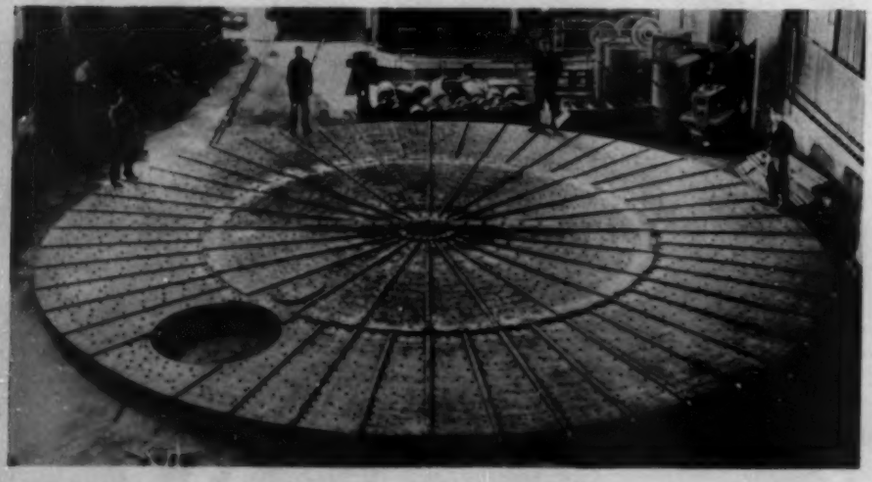
Care should be taken in grinding the flats, which should be at least 0.015-inch deep, because heat generated during grinding may lower the hardness several points without giving other evidence of burning.

Rounding off at the ends in grinding is a common fault. This results in the sample tilting and giving an incorrect hardness reading. Test pieces should be ground on a good surface grinder, preferably wet and held by a magnetic chuck. When checking rockwell hardness, the sample should lay flat on a flat anvil. V-blocks are not recommended. *Remember, no test is fool proof against carelessness in preparing the specimen or reading the instruments.*

Selection of NE Steels: There has been a tendency to think of the NE grades as weak or inferior steels. In some cases, this has resulted in the selection of grades having considerably higher carbon and consequently more hardenability than the original steel.

It should be remembered that the NE's are fine-grain alloy steels, produced by

SIXTY-FIVE TON DISTRIBUTOR PLATE



INDIRECTLY, weight of this 41-foot diameter distributor plate manufactured by American Brake Shoe & Foundry Co., New York—65-tons of it—soon will be felt by the Axis as it goes into action in one of the largest vessels for pressure operation yet to be designed. It consists of 90 heat resistant castings of Meehanite metal. End-Use of the unit is tied in with the manufacture of products important to the war effort. Photo by Meehanite Research Institute of America

a Jap's-eye-view of a

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the best alloy practice known to the industry and that they were developed on the basis of equaling the hardenability of the grades they are to replace.

In general, when selecting an NE steel to replace a former grade, you will do well to consider the grade recommended by the American Iron and Steel Institute and not arbitrarily select one having higher carbon. *The higher carbon may result in excessive hardenability which often leads to unnecessary trouble in processing the steel.*

Uniform Hardenability: A characteristic of the NE chromium-nickel-molybdenum steels worth mentioning is their uniform hardenability. At first we thought this quality was partially due to the special attention generally given new analyses, but now there have been thousands of tons of these analyses melted in the open hearth at the plants of Republic Steel Corp. alone, and the uniform hardenability still maintains.

The most logical explanation is that all the common hardening elements are specified and controlled to fairly narrow limits, leaving no residual elements such as chromium, nickel or molybdenum to float from zero up to and above their respective accepted maximums. Such residuals are generally the cause of excessive variations from heat to heat in grades not specifying all three elements. It has been noted, however, that in the NE grades, as would be expected when all elements are near the low side of one heat and all near the high side in another, the variance between the two is quite great. Fortunately such heats have been rare, and when encountered, the proper attention has resulted in finding an application where they have worked entirely satisfactorily.

As soon as the NE chromium-nickel-molybdenum oil-hardening steels went into production, a decrease in heat-treat distortion over some of our regular SAE grades became apparent. This permitted quenching the NE chromium-nickel-molybdenum steels slightly higher than indicated to be necessary by dilatometer or other methods of determining thermal critical points. The higher quench is not objectionable from a distortion standpoint because distortion will still be comparable to or less than it was in the former grades. This decrease in distortion with equal hardness of finished parts is a question not yet satisfactorily answered. A comparison of dilatometer curves of higher alloys versus NE grades gives at least a clue.

It is generally known that upon heating steel the thermal coefficient of expansion is about 0.00000636-inch per degree Fahrenheit until the Ac_1 and Ac_3 is reached. Between Ac_1 and Ac_3 it shrinks and again expands after passing through the Ac_3. The shrinkage between Ac_1 and Ac_3 is undoubtedly responsible for some degree of distortion, and the characteristic that causes variation in the amount of this shrinkage between different analyses is probably responsible for the difference in distortion during cooling or quenching. Please note in Fig. 4 that SAE-5140 has a much steeper curve at Ar_1 to Ar_3 than NE-8640.

This bit of information is merely an indication of what may be happening and it is not intended that it be taken as conclusive. However, it is hoped that someone who may have time will become interested to the point of conducting a more thorough investigation of these characteristics peculiar to the NE analyses.

It might be well to call attention to how some of the points just mentioned affect steel being heated or cooled in ordinary processing. A part made of ordinary alloy steel and having a dimension of 15 inches when cold, measures about 15⅛ inches when at 1350 degrees Fahr. When an irregular shaped part having thick and thin sections is heated, there is a temperature range where it may be expanding in the thick sections at about 0.001-inch per inch and contracting in the thin sections at about 0.001-inch per inch per 100 degrees Fahr. rise in temperature.

Fig. 4 shows dilatometer curves which are simply expansion in inches plotted against temperature in degrees Fahr. on a sample 3 inches long. Try to visualize what happens in terms of distortion when a part having thick and thin sections is heated rapidly through 1300 to 1500 degrees Fahr. The heavy sections heat slower and lag behind and are still climbing the temperature curve to the left of Ac_1 when the thinner sections, which heat faster, have passed the Ac_1 point and are coasting down or shrinking along the downward slope between the Ac_1 and Ac_3. This results in a push and pull effect between the thick and thin sections. The same condition maintains in cooling or quenching. However, it is more difficult to follow the mechanics of the quench side of the curve because the operation must be completed quickly.

Thus for minimum distortion and volume change in heat treating, parts should be heated as slowly as possible and quenched mildly and as near the bottom of the quenching temperature range as possible.

The designer is familiar with the conditions just mentioned, can often help. In other cases, however, he has little choice in the matter of eliminating critical sections or unsymmetrical parts.

The question may arise as to how are often heated rapidly and quenched parts have both thick and thin sections in large numbers with very little trouble from distortion. This is due likely to the technique of mass production. The parts all have the same distortion or volume change which has been or will be compensated for in earlier or subsequent production operations. Success of the job depends on the continued uniformity of this distortion. Automotive rear axle and transmission gears are excellent examples of this practice.

The indication that the NE steels take a little longer in passing through the critical transformation points means that they will not be affected by fast heating as much as some of the higher alloys. Or, when heated at the same rate, the NE's show slightly less distortion than the higher alloys.

Protection of Hot Steel to Prevent Rupturing: Apparently there have been some who thought that because the NE's are low in alloy, certain laws governing good practice in handling steel could be violated. Flaking or rupturing during cooling resulted under these conditions. This should not be charged to the analyses but to a violation of fundamental rules in handling steel.

If you have large forgings made of SAE alloys and you protect them in cooling, do likewise if you change to NE and no trouble should be encountered. It was to be expected that the NE grades would forge easier than high alloy grades. This is now proven but it does not mean that the NE's will not rupture, for instance in rounding up a square billet, if sufficient care is not exercised in breaking down the corners. In general, the rules governing good forging practice should be respected when forging NE steels just the same as with former grades.

Cold Shearing NE Steels: Convenient cold shearing information is shown in Table I. Shear cold only those sizes indicated "CS" in accompanying table. Others should be annealed or heated for shearing.

Machining NE Steels: Information is now available on the preparation of NE steels for machining. One plant formerly using SAE-5140 changed to NE-8640 and, after using approximately 20 full open-hearth heats for transmission gears and shafts, reports a 25 to 30 per cent increase in tool life along with a corresponding improvement in finish.

These forgings are prepared for machining by heating to approximately 1700 degrees Fahr., then cooling at 150 to 170 degrees Fahr. per hour to around 800 degrees Fahr., then cooling out in

(*Please turn to Page* 91)

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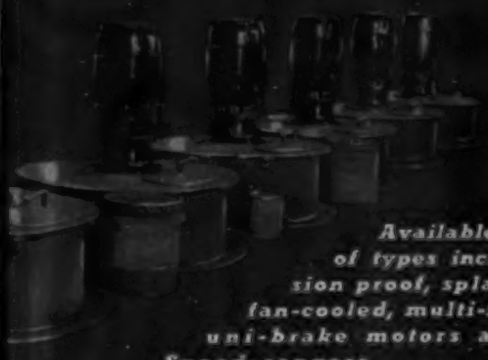

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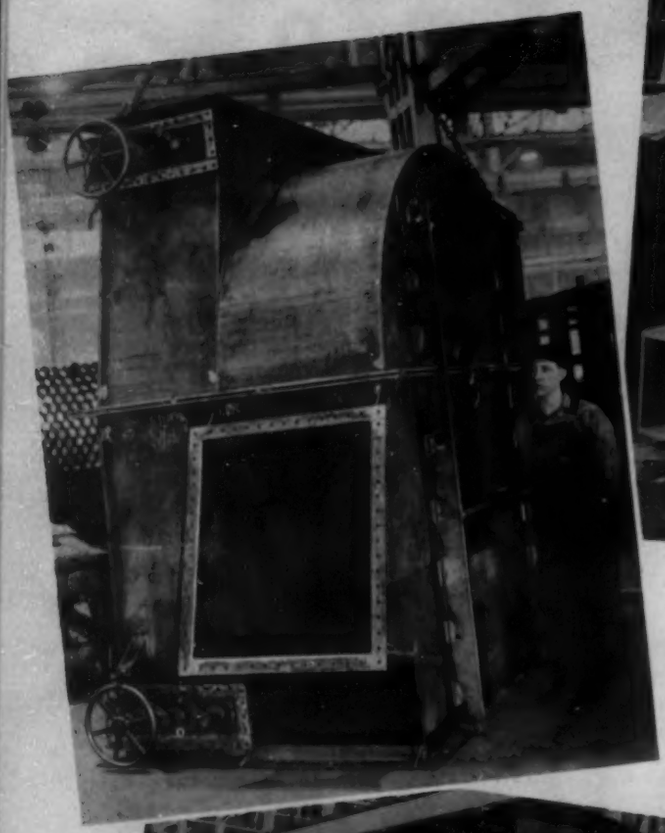
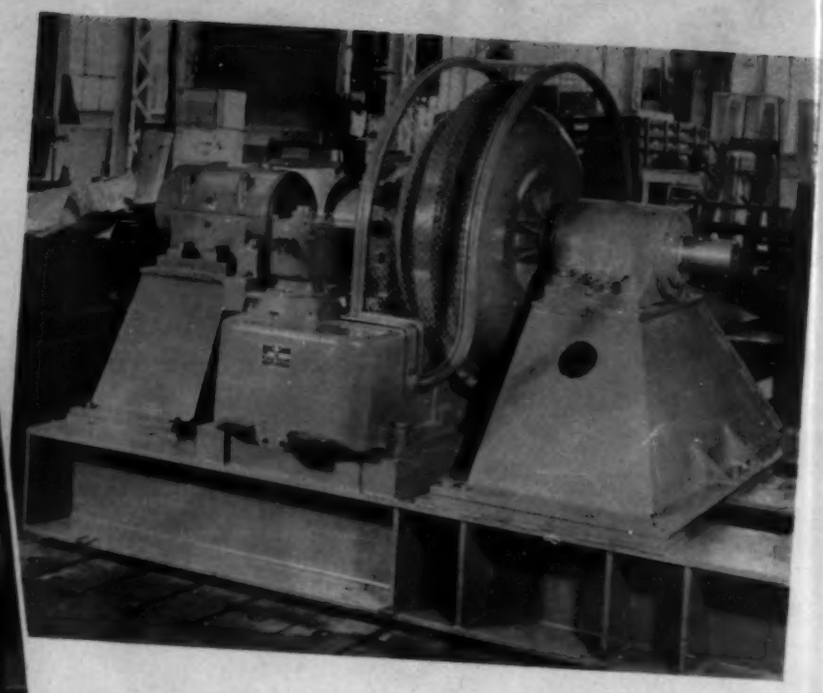




Top to bottom, left—Fig. 1—Hydraulic coupling bedplate made of welded heavy H-beams and heavy plate box pedestals

Fig. 2—Moderate suction exhauster for handling acid gas. Rigidity is important to prevent cracking of rubber lining

Fig. 3—Large welded fan housings must be split so that parts can be transported and erected

Fig. 4—Stuffing box side of large exhauster for 44-inches water gage

Fig. 5—Large backward blade wheel which is readily fabricated entirely of welded steel plate

Fig. 6. (Opposite page)—Sirocco wheel which is riveted throughout

INDUSTRIAL FANS

THEIR DESIGN

(Concluded from Last Week)

By MURRAY S. KICE
Chief Engineer
American Blower Corp.
Detroit

TODAY'S steel plant equipment aptly is made heavy to withstand continuous high load, without danger of shutdown. Fan equipment for this industry does not always get too serious consideration because the cost of all fans in a mill is a small part of the total cost of the plant and its machines. But air requirements there are vital—hence fans are most important from a functional standpoint of overall production and earnings.

During the last quarter of a century, the tendency was to heavy up the fan originally designed for light ventilating duty. Twelve gage was increased to 10, and ½-inch larger shaft and bearing was the finish. The ventilating fan was and still is made with riveted housings and wheels, because this light gage is easily worked with simple equipment such as shears, punches and rolls; and, assembly is not difficult because any mismatched bolt or rivet holes can easily be drifted.

As the fan gages increased, the problem of manufacture approached that of a boiler factory. But fans cannot command the market prices of power boilers because they do not have to be made to hold high pressure.

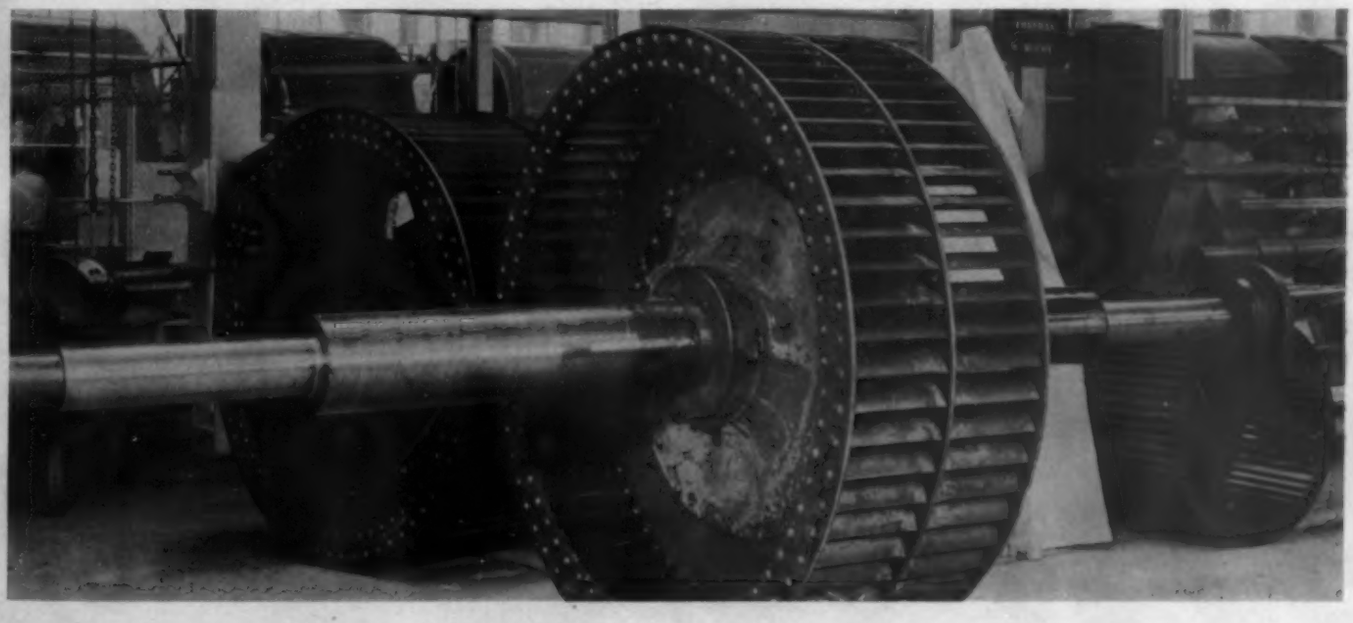
Fan building has undergone the same general transitions as have occurred in plants making similar articles, that is, the hooded arc welder and his flaming rod has enabled fans to be redesigned so that heavy plate can readily be worked at nominal cost. The author has been involved in the elements of structural design of special heavy-duty fan and allied equipment during the last 15 years and has discovered one thing in particular: Full advantage in arc welding technique accrues when many previous necessary items are eliminated. This includes such operations as layout, punching and drilling for rivets, and such parts as scroll angles. Often an entire recast of the main floor supports allows simplification.

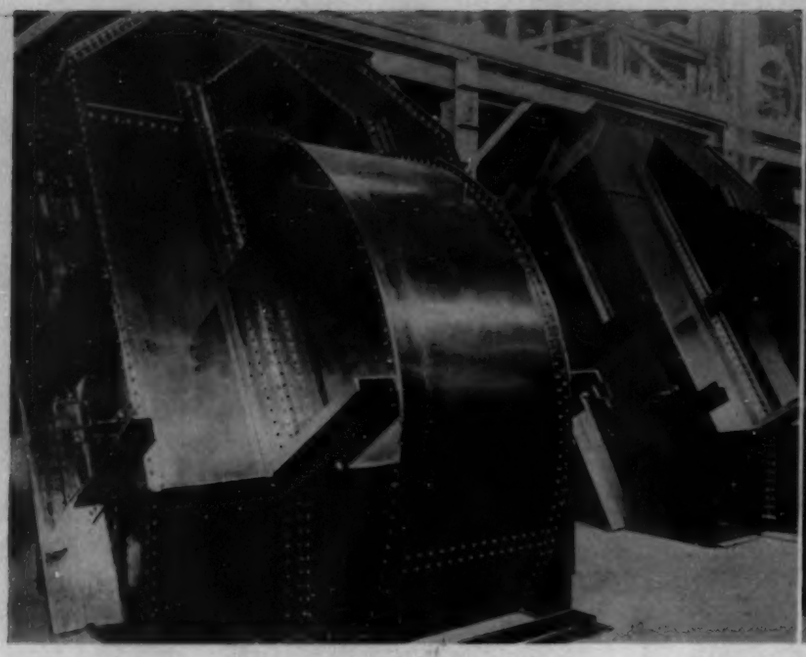
This changes the general appearance of the fan and its parts, but it clears the way to use heavy plate, to add inlet boxes, to provide split housings, to attach access doors, shaft seal frames, and such accessories useful in service.

The modern heavy plate fan, then, is like the old ventilating fan, except it is built dust or gas tight, is able to produce high pressure without vibration, to withstand corrosion or abrasion, and is far more accessible for maintenance.

From an operation and service standpoint the old and the new are entirely different. For example, a modern sintering fan takes quite a beating. It draws gases through the burning bed of ore dust, and is required to handle the hot gritty waste gas at high suction and velocities. Fig 7 shows a 1918 sintering fan, with bracing to hold the light plate then used. The static water gage was 18 inches. Fig. 8 shows a 1941 sintering fan whose combined thickness of housing and liners is ⅞-inch. This fan is considerably larger and operates against a suction of 30 inches water gage. Heavy plate, location and shape of inlet boxes, and splitting flanges serve to make the design self-bracing. There is no value to bracing if it is not required, whereas there is a definite asset to spreading costs for a thick plate housing because of longer life the thick plate affords to resist corrosion or abrasion.

Two wheels are contrasted in Figs. 5 and 6. The large backward blade wheel is readily fabricated entirely of welded steel plate, except for the small tubular cast steel hub which is welded into the assembly; whereas the Sirocco wheel is riveted throughout because complete tooling is available and riveting is cheaper. The high-speed wheel handles 750 degrees Fahr. gas at low suction, and the smaller Sirocco wheel produces 20 inches suction at 550 degrees Fahr. The hub is cast steel because welding here does not pay.





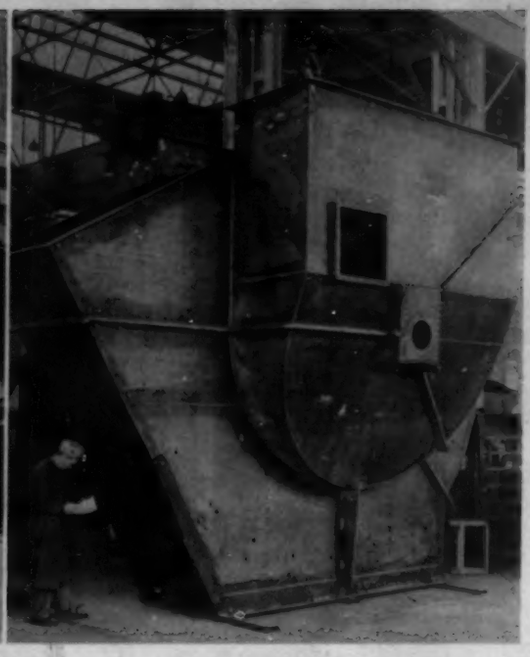


Fig. 7. (Left, above)—Sintering plant fan of 1918 design with bracing to hold light plate then used

Fig. 8. (Right)—Sintering plant suction fan of 1941 design. Heavy plate, location and shape of inlet boxes, and flanges serve to make it self-bracing

A good use of welded heavy H-beam structurals and heavy plate for box pedestals, for a hydraulic coupling bedplate is shown in Fig. 1. The driving motor is not mounted.

For stiffening large areas of relatively light plate, or for making high-suction areas stable, standard rolled structural shapes have been used universally. This has complications, especially now, when it comes to availability of stocks. There always has been the problem of desirable proportions, such as an angle iron ¼ x 1-inch x 10 inches. Channels have been split, but that is more troublesome than to break the shapes from plate. The formed angle can be made from scrap ends of large plates.

When welded, no flange is required adjacent to the wall or side of the fan, because in this construction the plate replaces the structural flange. Hence the long leg angle is inverted and welded to the side just the opposite as if it were riveted.

The stuffing box side of a large exhauster for 44 inches water gage is shown in Fig. 4. This radial blade fan is controlled by inlet vanes, and operates for long periods at near shut-off. Heavy air pulsation vibrates the housing. This combination of inverted angle and band iron stiffening makes this large area rigid and stable.

A large number of moderate suction exhausters recently have been supplied to handle an acid gas, hence they were covered inside with vulcanized sheet rubber. Rigidity again is important to prevent troublesome rubber cracking and consequent fatal steel corrosion.

The combination of ¼-inch plate, bracing by inverted angles and splitting flanges provided the desired stiffness. Dampers were built into the top and bottom of the boxes to control gas flow at these two points, in a required cycle of operations. Access doors, flushing nozzles and drain were required for washing periodically. Again bent plate frames were welded up in temporary fixtures. Companion holes were drilled from templates. Hence these accessory parts, all rubber covered, are interchangeable. This is shown in Fig. 2.

Large housings, when welded, must be split so that the parts can be transported and erected. In the case of Fig. 3, back to back 16 x 2-inch bent inverted angles serve as bracing and companion flanges. The section of scroll between the major verticals is attached by bolting to welded scroll angles, to avoid a center piece of a bad horseshoe section. The secondary stiffening is 8 x 1½ inches and the minor stiffening at the top is band iron. Note man on ladder between fans.

Fans for slab annealing furnaces are made of stainless steel as they have to move radiant gases at temperatures up to 1300 degrees Fahr. The forward curve fan is advantageous here as it requires less poundage of critical alloys and operates at the lowest stress due to its low speed.

Fans used to cool mill motors usually have housings made of 3/16-inch steel but are furnished with heavy pedestals, shafts and bearings. They usually are of the double inlet backward blade type as the combination of volume and pressure and this type of fan results in a fan speed advantageous for direct connection to standard frame electric motors. These fans suffer little from corrosion or abrasion, but the general mill dust is likely to collect on the fan blades. This tends to throw the wheel out of balance. Therefore, straight stiff oversize shafting resists ensuing vibration.

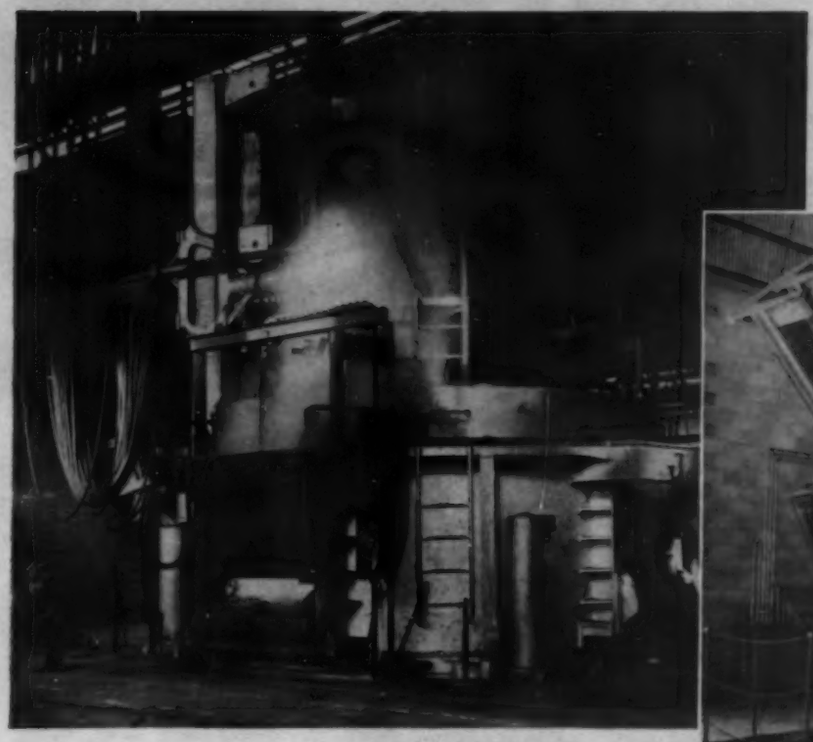
Heating, ventilating and air conditioning fans supplied to the steel industry, usually are the standard articles used for that service everywhere else.

Heavy process fans that move air necessary to carry on the operation of making or rolling steel, however, must be sturdy, efficient and reliable, as it goes without saying that steel production must not be stopped—not even slowed down so far as fan equipment is concerned.

Develops Quick-Acting Industrial Window Cleaner

A new product called Saf-T-Klenz for use in washing industrial windows and removing other discolorations from shower room floors, walls, fountains etc., is announced by Berman Chemical Co., Toledo, O. It is said to eliminate the use of strong acid solutions in attempting to remove iron rust and other shop dirt.

The product is offered in a nondeteriorating dry powder form. Besides cleaning, its action is reported to cause obnoxious odors to vanish immediately.



A 75 ton, size "J" LECTROMELT furnace used on alloy steel production in a large eastern steel plant.

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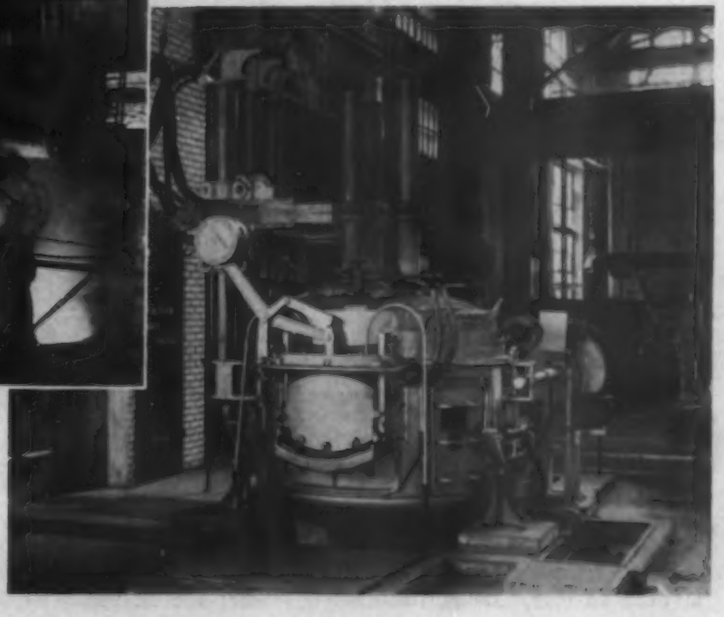

The American "BLITZ"

Photo by Charles Phelps Cushing

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THE TREND IS TO GAS
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NE Alloy Steels

(*Concluded from Page 84*)

the air. Hardness is around 179 brinell.

NE-8620 is reported to machine better when normalized from 1750 degrees Fahr. than when annealed. The annealed structure is inclined toward banding and is quite soft and gummy.

NE-8720 is apparently a little too high an analysis to machine well when normalized, especially when near the high side of the range. It is being annealed for machining on the Gleason Formate machine and other gear cutters. We have no experience at this time with the lower carbon NE-8600, 9400 or 9500 grades. Annealing information is being developed on the NE-9500 grades.

Applying NE Chromium-Nickel-Molybdenum Steels: When changing from SAE-5140 to NE-8640 on transmission gears, the splined bores of sliding gears did not close in as much as the 5140 in final heat treating, making a size change necessary.

Quench the chromium-nickel-molybdenum grades higher than indicated, not lower.

In cases where NE-8620 and 8720 have replaced SAE-4620 tempered at 400 degrees Fahr., it has been found necessary to temper the NE's approximately 50 degrees Fahr. higher, or at 450 degrees Fahr., to obtain hardness equal to the 4620 which was 59 to 62 rockwell C.

The NE chromium-nickel-molybdenum 9400 and 9500 oil-hardening grades show a slight drop in impact value when quenched and drawn at 600 degrees Fahr. similar to the SAE chromium grades when drawn at this temperature. Until more experience is accumulated, it is recommended that the range of 500 to 700 degrees Fahr. be avoided in tempering or drawing just as it was on SAE-5140 and similar analyses. Since there is so little occasion to draw at 500 or 700 degrees Fahr., the condition was never considered to be a serious objection to the analyses.

Applications: The NE steels have now been applied successfully on practically every type of machine part formerly made of SAE and AISI grades. Following are comments on a few such applications. Some of these grades are now obsolete but are shown here for their comparative value.

NE-8749 has been used exclusively in a large forge shop for cold shear blades since April, 1942. It is reported to be entirely satisfactory when normalized at 1650 degrees Fahr., reheated and oil quenched from 1525 degrees Fahr., tempered at 800 to 900 degrees Fahr. for 3 or 4 hours to hardness of 444 brinell.

NE-8744 is replacing SAE-4340 on highly stressed shafting, oil quenched and drawn to about 429 brinell.

Reports from users in various industries are to the effect that NE-8620 is satisfactorily replacing SAE-4620 and equivalent grades. Also reported is that NE-8720 and 8817 are satisfactorily replacing SAE-2515 and 4815 in such parts as truck rear axle and transmission gears and other automotive parts.

NE-8630 tests indicate that it is equal to SAE-3130 for automotive front axle steering knuckles and arms when water quenched from 1550 degrees Fahr. and drawn to 300 brinell hardness.

NE-8630 is satisfactorily replacing SAE-4130 tubing, both pierced and welded.

NE-8949 torsional-fatigue tests indicate that it has slightly higher endurance limits than SAE-3240 or 4340, all being heat treated to 400-444 brinell hardness.

NE-8949 has satisfactorily replaced SAE-3150 for machine tool spindles and arbors.

NE-8617 direct quenched has satisfactorily replaced SAE-2315 double quenched in automotive front axle king pins. Here wear resistance and a tough ductile core are chief requirements.

Why NE Steels Substitute Satisfactorily: The success of NE steels may be partially due to a reserve of experience built up in this country which is equivalent to a sizable amount of alloy in our constructional steels. Many who draw on this reserve fail to appreciate fully its worth.

An engineer of unquestioned ability once said that when a unit of knowledge is put into the design or fabrication of a mechanical unit, an equal amount of material or weight can be taken out. Our engineers have been contributing knowledge resulting in better designs, machine tools and inspection facilities. The manufacturing departments, including steel makers, have contributed precision and uniformity. It is apparent that designs, materials, and fabricating processes have been improved to a far greater extent than weight or alloys have been taken out. Thus, the alloy content of the steel can, in many cases, be reduced without harmful effect. This undoubtedly is partially responsible for the success of the NE steels in replacing high alloy grades.

Revision of NE Steels Necessary: The scarcity of certain alloy elements coupled with the increased alloy contamination of remelting scrap has already been responsible for two revisions of the original NE specifications.

In September, 1942, several of the manganese-molybdenum analyses were deleted and NE-9400, 9500, and 9600 series released. This revision was primarily to conserve molybdenum. The NE-9400 series also effected a savings in chromium and nickel over the former chromium-nickel-molybdenum grades. It still utilized these alloys in the form of residuals up to 0.40, 0.50 and 0.15 per cent, respectively. At the time of its release there was some question as to whether residual nickel would increase and exceed the 0.20/0.40 per cent nickel specified and thereby render the 9400 series impractical from a melting standpoint. Unfortunately this proved to be the case and resulted in a second revision of the NE specifications late in December, 1942.

Confronted with molybdenum still on the scarce list, nickel residuals increasing, and scrap becoming more and more contaminated, a group of industry and government committees made the following changes to the specifications as published Sept. 22, 1942.

Delete NE-8022.

Delete all NE-8700, except NE-8720.

Extend the NE-8600 carbon range up to 0.50 per cent.

There was not sufficient justification for carrying both 8600 and 8700.

They differ only by 0.05 per cent molybdenum and obviously the one having the highest molybdenum was deleted.

Delete NE-8949.

Increase NE-8600 nickel content from 0.40/0.60 to 0.40/0.70 per cent.

Increase NE-9400 nickel content from 0.20/0.40 to 0.20/0.50 per cent.

Increase NE-9500 nickel content from 0.40/0.60 to 0.40/0.70 per cent.

Changes in the supply of alloy are beyond control. Therefore, changes in alloy composition may come frequently and suddenly. Obviously it behooves steel users to equip themselves with test facilities and information necessary in making such substitutions quickly as outlined in first part of this article.

Certain alloys are scarce, not because officials in Washington get pleasure out of restricting their use, but simply because, with our present high rate of steel consumption, there is not enough to go around. It behooves every one of us to get behind the alloy conservation program and help stretch our available supply as far as it will go. *It is your duty as an American citizen to investigate the use of high alloy steel under your jurisdiction. If it can be replaced by a lower alloy or an NE grade, then you should set the substitution machinery in action.*

For details of much test data accumulated on heats of NE steels, see the booklet "National Emergency Steels," published by Republic Steel Corp., Cleveland, from which the information above was taken.

New and Revamped Factories

ROLL OUT THE WARPLANES

. . . . in ever-increasing numbers by means of conveyorized production lines

By A. D. PALMER JR.
Curtiss Airplane Division
Curtiss Wright Corp.
Buffalo

ESSENTIAL to the achievement of the fine production record being chalked up by Curtiss-Wright Corp.'s Airplane Division is the careful planning of manufacturing practices and procedures best qualified to produce this result. Conveyor systems aid materially in speeding up the straight-line production of Curtiss warplanes throughout all the plants.

The first answer to the enormous demands for warplanes was the construction of new factories, the expansion of existing plants, the addition of thousands of workers. In the rush of expansion, little thought was given to improving production methods. There was only a frantic effort to build over-night a fleet of warplanes.

In the early days, airplane manufacturers "chewed them out with their teeth". Each part was made separately and fitted separately, even if there were a number of ships on order. In those days a crew of workers would start with the individual parts and follow the airplane step by step through its construction. Frequently so much time elapsed between the first and second ship of one order that the subsequent airplanes would be changed materially. As one can easily imagine, this procedure didn't produce many airplanes. However, no one can deny the quality of the ships built by American companies. The present superiority of American warplanes is largely the result of the painstaking care with which their predecessors were built.

One of the earliest attempts at mass production was made in World War I

Fig. 3. (Right)—Gravity roller conveyor system in machine shop inspection department insures chronological inspection of finished parts, increases efficiency of operators and keeps a steady flow of material going to the assembly departments

Fig. 4. (Opposite page)—U-path of this roller conveyor setup was found best for assembly of landing gear sections on a straight-line production system. Layout eliminates 30 per cent of operations. All photos from Curtiss Airplane Division, Curtiss-Wright Corp., Buffalo

Fig. 1. (Opposite page)—This is the bulkhead assembly conveyorized layout, including work stations for drilling, riveting, nut-running, trimming final assembly and inspection. Conveyor belt is 60 feet long, 20 inches wide. Layout shown here saves over 60 per cent of floor space formerly required, yet has greater production capacity

Fig. 2 (Left)—This shows bench assembly layout in the bulkhead department before the new belt conveyor was constructed. New conveyor layout was planned to take up only about 30 per cent of this floor space

when Curtiss established a record that stood for 20 years by building nearly 5000 JN-4D "Jenny" trainers for the Army. What is said to be the first real mass-production line was set up by Curtiss in the Missouri plant for the construction of the Curtiss "Robin", a 3-place sportsman plane. Seven-hundred forty-nine "Robins" were produced and sold in slightly over a year.

Again the record has been broken by the current production of the famed P-40 fighters, "Tomahawks", "Kittyhawks" and "Warhawks". The experience gained in the earlier feats of production had much to do with this new record. The tremendous demand for fighting aircraft made possible the establishment of continuous production and fabricating processes on an unheard-of scale.

Individual operations were simplified. The physical layout of the plant was Improved. *Most important of all, work was brought to the worker on conveyor systems instead of the worker having to follow it through the factory.*

Most of the conveyor systems used by plants of the Curtiss-Wright Corp. are not spectacular, but the fact remains that they are responsible to a large extent for the excellent production records established in these plants. Conveyor installations have been made only where they would help to build more airplanes. All are a result of careful efficiency surveys. By eliminating duplication of effort and smoothing the flow of material to workers' stations, production rates are increased almost automatically.

Fig. 5—Platforms with locating blocks and speed clamps are used with a roller conveyor to speed assembly of control pedestals here

In the landing-gear department, for example, the carefully made parts which come from the machine shop are assembled into landing-gear units at a number of work stations. Production engineers made exact time and motion studies of these operations. They recommended a production-line conveyor to handle the work between operations. A horseshoe-shaped roller conveyor was installed to facilitate movement from station to station. Production jumped ahead quickly. The result is that now two-thirds of the number of men previously required are producing 200 per cent more landing-gear assemblies.

Conveyor systems increased enormously the efficiency of the various inspection departments. The roller conveyor shown in Fig. 3 is used to aid inspection in the machine shop. It eliminates the danger of damage to precision parts. Too, it keeps parts in proper sequence to insure inspection in chronological order. Inspectors can work more accurately, and the work moves down the production line faster. A steady flow of parts to the assembly department is assured.

Conveyors were installed in many subassembly departments. The construction of bulkheads, for example, previously required a considerable amount of floor space and many workers. Fig. 2 shows the old bulkhead bench assembly system. Parts had to be carried manually from bench to bench, resulting in a certain unavoidable amount of unproductive space utilized for storing parts at each work station as well as considerable excess motion in handling them repeatedly.

Careful time and motion studies were made to select a conveyor system that would do the best job. The result of these studies is pictured in Fig. 3. The new bulkhead assembly line works on an endless, powered belt, which saves 60 per cent of the precious floor area formerly required. At the same time, it makes possible the production of bulkheads in larger quantities than ever before. Note that the work stations are arranged to feed in from both sides of the conveyor. Initial operations starting at the front in Fig. 1 are completed by workers farther down the line.

All through the subassembly departments in all plants, the conveyors step up production. AT-9 control pedestals are assembled on the straight-line roller conveyor shown in Fig. 3. Proper job sequence and simplification of operations speed up production 40 per cent. The pedestals are mounted on plywood platforms which in turn rest on the conveyor rollers. Blocks on these platforms fit around corners of the pedestal to position them. Quick-acting hand clamps anchor the pedestal to the platform.

The press department employs a double width or two-line roller conveyor that has eliminated 50 per cent of the handling formerly required. Parts are moved easily from worker to worker. Individual sections of roller conveyor for each worker are ranged along both sides of the main conveyor and greatly facilitate operations in handling what would otherwise be excessively large sections or sheet metal subassemblies.

Landing gear oleo struts are assembled on a new straight-line production line served by a roller conveyor which eliminates 30 per cent of the operations and saves one-half the time formerly required. See Fig. 4. Experience gained on warplane oleo assembly is applied on a conveyor line for landing gear for trainer planes with a resulting increase in production of nearly 50 per cent.

Referring to Fig. 4, note the fixture employed to hold the assembly during the various operations. The main section or outside cylinder of the unit is clamped between wooden blocks built up on a wooden platform which in turn rides on the conveyor rollers. The upper block that clamps the cylinder is hinged at one end and a speed clamp provided at the opposite end so the work can be inserted and fastened in position quickly. Likewise it can be removed from the fixture simply by flipping the handle of the speed clamp.

This simple fixture facilitates the assembly operations since the work can be moved around on the conveyor rollers to any position wanted, and with the minimum amount of effort. Yet the work is held up off the conveyor and at correct working level for the various assembly operations.

Racks of parts with four or more shelves are positioned alongside the assembly stations for ready access.

(*Continued Next Week*)

Makers of Porcelain Enameled Tanks To Meet

A general conference covering porcelain enameled tanks for domestic use is scheduled to be held early Thursday morning, April 22, at the Hotel William Penn, Pittsburgh, according to an announcement recently released by the National Bureau of Standards, Washington.

Purpose of the meeting, which begins at 9:30 a.m., is to invite comments and suggestions in order that the new proposed commercial standard, TS-3449, may be adjusted so far as practicable to meet desires of all those directly concerned.

Larger Electrodes

(*Concluded from Page* 74)

change was made to "Fleetweld 9" in the ¼-inch size, the same weld could be made in one pass with a 30 per cent saving in cost. A total saving of 43 per cent was achieved when, in addition to using larger electrodes, the company welded the stator frames in a welding positioner, which permitted the welds to be made in the downhand position.

Food Mfg. Co., Lakeland, Fla., making an amphibian tractor, analyzed the savings made on welds on the stern and catwalk. The stern has 132 linear feet of welding, formerly done with 5/32-inch electrodes in 6 hours. Shifting to a 3/16-inch electrode, the time was cut to 4 hours. When a similar shift was made in welding catwalks, 30 minutes per 140-foot unit of structure was saved.

Other companies reporting increases in welding speeds through use of larger electrodes are: Teleweld Inc. of Chicago, doing structural and penstock welding, 100 per cent; Stevens Metal Products Co., Niles, O., 150 per cent; Aetna Iron and Steel Co., Jacksonville, Fla., 73 per cent; Downingtown Iron Works, Downingtown, Pa., 22 per cent; Allith-Prouty Inc., Danville, Ill., 66 per cent; Butler Mfg. Co., Kansas City, Mo., 20 per cent; Clyde Iron Works Inc., Duluth, Minn., 15 per cent; Calvert Iron Works Inc., Atlanta, Ga., 15 to 20 per cent; and St. Paul Structural Steel Co., St. Paul, Minn., 66 per cent.

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JESSOP Quality Tool Steels are the products of modern manufacturing facilities and practices. The manufacture of steel and the control of quality begins with the selection of raw materials. Careful tests and inspection of each processing step, from melting in the newest type of electric furnaces through rolling and treatment, guarantee quality that meets the rigid specifications set up by the Jessop Laboratory. Our staff of experienced metallurgists and service men give practical assistance in selecting the proper type of steel for individual applications.

ARMY E NAVY

JESSOP STEELS

High Speed • Special Alloy • Composite Tool Steel
Carbon • Stainless • Stainless-Clad (Silver-Ply)

ESTABLISHED 1901

Cartridge Case Dies

(*Continued from Page 76*)

These are drilled in the following manner:

After carefully centering the drill, hole X is drilled through the entire length of the die. This operation is followed by rough drilling the larger end A to a depth where the radius just starts, using hole X as a center. Several progressively smaller drills are then used in steps to roughly form the contour.

Reaming: Next, radius B is developed by reaming, using a special reamer made to accurately fit a template. Some plants have found that this radius can also be generated by boring, using a cam to control the path of the boring tool.

Hobbing: Besides drilling and reaming, hobbing is being used as a method of shaping out bullet jacket contour dies. After drilling is completed, the first hob, which is just a trifle larger than the drilled hole, is driven into it.

Additional hobs, each slightly larger than the preceding one, are used until the required inside diameter is reached. The hobbing method generally calls for one or more intermediate annealings, as otherwise the steel would become quite brittle after being cold worked in this manner.

Heat Treating: Regardless of the size or shape of the dies, the heat-treating operation is extremely important and probably is the cause of as much trouble as any other single operation in the manufacture of tungsten-steel cartridge-case and bullet-jacket dies.

Procedure: Although various techniques and methods are being employed for heat treating the dies, we have found from observations that the method outlined briefly below is about as satisfactory as any:

—Die is stress-relieved before hardening. Die is placed in lead bath and heated to approximately 1525 degrees Fahr.

—Die is placed in fixture and water under pressure is forced through bore for approximately 40 seconds. In every case, the water spigot should be the same size as the smallest diameter of the die bore.

—Die is placed in a solution of brine and allowed to "soak" for approximately 20 seconds. Solution should contain 5 per cent brine by weight.

—Die is removed from brine and placed in warm water for a few minutes.

—Die should then be tested for rockwell hardness at three points at end of die—at hole, halfway to outside diameter and at the outside diameter. Most tungsten-steel die requirements are 62 to 65 rockwell C at the hole, approximately 55 halfway to the outside diameter and 35 to 40 on the outside diameter.

—Die should be tempered as soon as possible after quenching, at least within an hour.

Grinding Outside Diameter and Ends: In some plants the outside diameter and ends are rough round before heat treating and finish ground afterward. However, the preliminary rough grinding operation probably is not necessary if the ends and outside diameter have been carefully turned.

Grinding of the outside diameter and the ends of the die is required in order to finish the work to the exact dimensions and also to remove the light scale which forms during heat treating. Various types of grinding machines are used for each of these operations and the grinding wheel specifications naturally depend upon the particular type of machine, as well as shape and size of the wheel. In any case, a relatively fine grit and soft grade of aluminum-oxide vitrified bonded wheel should be used.

Because of the unusual hardness and resistance to abrasion offered by the tungsten steels in the hardened state, the wheel feed must be very light—no more than 0.0005 to 0.001-inch per pass—and the wheel carefully dressed with a diamond. On both the cylindrical and surface grinding operations, a plentiful supply of coolant should be used as otherwise the steel may develop grinding cracks from being overheated. Dies with the slightest appearance of burn or with any evidence of grinding cracks are rejected.

The outside diameters are ground in either cylindrical or centerless grinding machines. Here again the operator must be careful to employ very light feeds with carefully dressed wheels. The grinding must be done wet in order to keep the work cool. A typical grinding wheel for grinding outside diameters on a plain cylindrical machine is a Norton 3880-I8BE Alundum vitrified wheel. This specification is being used with good success in a number of die manufacturing plants.

For surface grinding the ends of the dies on a vertical spindle type of grinding machine, Norton 1980-I Alundum vitrified wheels have been found satisfactory.

(*Please turn to Page 106*)

MAMMOTH MACHINE WITH DELICATE TOUCH

INDIRECTLY, this huge 131-ton Ingersoll milling and boring machine, recently installed in the Mt. Vernon, O., plant of Cooper-Bessemer Corp., is one of the factors responsible for boosting the production of high-octane gasoline, synthetic rubber, synthetic ammonia, and other essential war materials. It is currently being used to mill and bore, in 60 per cent less time, large motor-driven compressor beds, 10 feet high, 8 feet wide and 26 feet long used for compressors furnishing the gasoline. Thirteen switch buttons govern every movement of the machine. Operator can stand at any point along the work-piece to observe and control the actual operations. He can move this tremendous weight to within one thousandth of an inch of a required setting.

The Brass Industry has come a long way . . .

SINCE BRASS-MAKING SKILL WAS SMUGGLED IN WINE-CASKS

TIME WAS, when brass-making was a matter of individual skill built on hit-or-miss experience. And the master brass-casters, whose secrets were their capital, would part with their lives sooner than their knowledge. Yet there were all too few of these men, which sometimes meant that, to start a new brass foundry in America, a caster or two had to be spirited from England in a wine-tun. Also, it meant that brass-quality was variable, sometimes a strange and wonderful thing.

But brass-buyers broke up that situation by demanding that brass meet definite specifications uniformly and consistently. Then real progress began. And now at Bristol, it's taken as a complaint when a customer remarks: "You people make brass that's right on the nose only 99% of the time!"

Nowadays, the uniformity of the different analyses . . . specified for Bristol sheet, rod and wire . . . is watched with the vigilance of a front-line sentry. Because up to the front lines is where it's going, in cartridges, shells and other war material. And, for this fighting service, no effort is left unmade to produce brass "on the nose" 100% of the time. Apparently this is actually being done, *for we have heard no word to the contrary.*

THE *Bristol Brass* CORPORATION

MAKERS OF BRASS SINCE 1850 — BRISTOL, CONNECTICUT, U. S. A.

Licking the Gaging Job

(*Concluded from Page 72*)

gineering design and processing under this system. The gage wear allowance of cylindrical plug standard nibs is broken into five classes. These are shown in Table I.

"As wear progresses on a Packard gage," Mr. Varel explains, "it wears from an 'A' size through the 'E' size, a range of 0.00075-inch for a *GO* nib. There is then 0.00025-inch left for lapping for taper, to make it an 'A' grade nib in a size a full thousandth smaller. It is then renumbered."

While wear is progressing, many nibs move from one department to another because the first department cannot use a lesser grade nib. They are routed to departments where the lesser grade nibs can be used in that particular size. To accomplish this, control records are kept with a card for each size nib, showing all departments in which that size is used as well as the part number it is used on, the operation number and grade of nib required.

This control is effected through coordination between Standards Division which controls Tool Stores (as well as approximately 40 tool cribs), and the Processing and Inspection Departments which have charge of the periodic inspection of gages. By this method, a precise quality control is made practical —a control not possible under conventional procedures. Yet this control is had at little expense.

The problem of adequate gage delivery and supply is general. The hazard of lost machine and assembly time, coupled with the danger of prohibitive scrap, is well known. This picture of the inspection problem makes Packard procedure most significant as a solution.

One of the fundamentals of this problem is a new viewpoint . . . the viewpoint of the large-scale user of gages, rather than that of the gage manufacturer. Much previous standardization has been done by the gage maker to reduce needless variation in basic designs for a standard job. The present requirement is for a critical analysis of the basic functions of limit gaging; then, as Mr. Varel suggests, trial of the principles evolved to develop centralized procedure from actual experience.

There are literally hundreds of detail questions still unanswered by *B4a*-1925 or by the American Gage Design Committee's *Commercial Standard CS*-8-41, which became effective in January, 1942. Perhaps this Packard procedure may point the way to a national pool and salvage setup which would have the ability to eliminate possible bottlenecks, increase gage life, conserve gage costs and make for more accurate assurance of interchangeability.

Packard has an enduring "Work To Win" program which has already been much publicized. (See STEEL, May 18, 1942, p. 68). In line with this program, conceived by president George T. Christopher and developed by the joint management-labor committee, a rhythm of campaigning is constantly used to inspire Packard war workers to do their best and to express their ideas to step up war production For example, WPB's first "Certificates of Individual Award" were given to Packard employes for their production suggestions. To date, Packard employes have won 20 out of the total 84 awards so far declared by WPB in Washington. This is a total greater than that secured by employes of any other company, and sets a national record.

At present, a new series of "Work To Win" plant posters, unusually well executed with an illustrative technique in the simile treatment, is pointing out the importance of use and care of gages. These liken such tools to diamonds in value. They point out the importance of using gages as the precious instruments they are.

GE Salvages 388,300,000 Pounds of Scrap in '42

Enough scrap to fill every car in more than 100 average freight trains—388,300,000 pounds—was salvaged for reuse by General Electric plants during 1942, it was revealed recently by H. J. Beattie, of the company's general manufacturing organization.

"Four-fifths of the total was shipped to steel mills, foundries, smelters and other large users of iron, steel and nonferrous metal scrap," Mr. Beattie said. "The remainder was used in company operations."

According to Mr. Beattie's annual report, the year's salvage activity yielded 318,500,000 pounds of iron, steel and alloy steel scrap, 31,200,000 pounds of copper, copper alloy scrap and brass, 22,700,000 pounds of lead, 4,300,000 pounds of aluminum and 2,500,000 pounds of zinc.

A "treasure hunt" for obsolete tools, fixtures and other dormant scrap accounted for 25,250,000 pounds of materials of all kinds. Also recovered were 85,300 ounces of silver.

Value of International Steel Cartels Appraised

International Steel Cartel, by Ervin Hexner; cloth, 399 pages, 6 x 9 inches; published by the University of North Carolina press, Chapel Hill, N.C., for $6.

International cartels have caused much controversy in both democracies and dictator countries and have been accused of undermining national political ideals and causing strife between nations. On the other hand, cartels have been urged as a pattern on which economic cooperation of nations could be built.

In this study the author examines the cartel concept and traces development of the International Steel Cartel. As a representative of Czechoslovakian steel industry he participated directly in the operation of the cartel. He assumes that many generalizations on the subject grow out of insufficient study of the facts.

He undertakes a description and appraisal of the greatest collective marketing control in history. Underlying political ideas are covered, with the interaction of politics and economics.

Of particular interest are the chapters on American participation in the International Steel Cartel and the author's conclusions concerning the potential position of international cartels in future world order.

Tables and appendices provide much statistical information on steel production, steel exports and world steel prices for the past 20 years. Texts of important steel agreements provide valuable material for study.

Armco's New Sheet Metal Withstands Heat, Corrosion

Aluminized steel, a new specialty sheet metal recently developed by American Rolling Mill Co., Middletown, O., for use in products requiring exceptional resistance to heat and corrosion is reported to combine the surface-advantages of aluminum with the strength of steel.

Corrosion resistance of this mild steel sheet coated with aluminum is said to equal that of an aluminum sheet. When exposed to corrosive attack, a tight oxide film forms on the surface the company explains. The metal is passive in most atmospheres and resists "pin-holing."

The metal also withstands temperatures up to 1000 degrees Fahr. without discoloration. The aluminum coating, it is said, will not peel or flake in moderate forming or drawing operations.

Although the aluminized steel has all the surface qualities of aluminum, a 16-gage sheet of the coated steel uses only 5 per cent as much as the lighter metal as a solid aluminum sheet of the same thickness. Present aircraft applications include fire walls and air intake filters. It is also being considered for cowling.

We found a way to out-fox the Axis

WHEN THEY CORNERED SWEDISH SPRING STEEL

THINGS looked serious when Hitler shut off shipments of steel from Sweden. Valve springs—so all-important to the efficiency of automotive engines—were made largely from Swedish steel wire rods. Manufacturers swore by the Swedish product—thought nothing could take its place.

Faced with this situation, our metallurgical experts went to work and developed a domestic valve spring steel not only equal to the finest Swedish product, but *better*. Today our plants are making huge tonnages of this steel by the Open Hearth process, employing closely controlled heat treatments and newly developed wire-making practices. The Axis has been out-foxed again—they failed to put a crimp in America's automotive production.

Valve springs made from this domestic steel are giving superb service in the hard-working motors of American trucks, tanks and jeeps. Even in the stepped-up requirements of war service they are doing an outstanding job.

Production of this superior valve spring steel was no lucky happenstance. It was possible because of our long experience, as America's largest wire makers, in making high grade steels.

This wire-making "know-how" has helped solve one tough war problem after another. From this unequalled background and the accelerated progress of these war years, will come new and finer products to serve you in the coming years of peace.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

United States Steel Export Company, New York

Wire for War Products

COLD FINISHED STEEL BARS · COLD ROLLED STRIP STEEL · MANUFACTURERS' WIRES STAINLESS STEEL · SPRING WIRE WELDING WIRE · WIRE SPRINGS

UNITED STATES STEEL

INDUSTRIAL EQUIPMENT

Induction Heating Units

Van Norman Machine Tool Co., Springfield, Mass., announces two new induction heating units for surface hardening, brazing, soldering and other heating applications requiring localized heat. These are reported to meet average requirements of every plant, both large and small.

Available in two sizes, 16 and 32 kilowatts, the induction unit is a completely enclosed unit readily adaptable for heating of many parts manufactured in small lots, or it can be incorporated into a production line.

In operating, the operator merely connects the proper heating coil for a particular job . . . sets the heat and quench cycle required . . . and piece after piece is hardened, brazed, soldered, etc. in a few seconds.

To change from one job to another the operator simply changes the work-

holding fixture and heating coil and resets the heating cycle to meet the new requirements. Some of the advantages offered by the new units, the company states, include: Uniform hardening, accurate results, increased output, conservation of alloy steels, reduced spoilage, reduction in costs and important savings in time.

Cleaning Machine

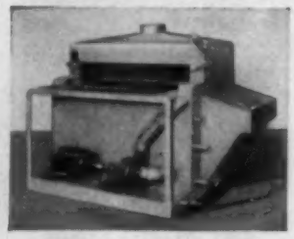
W. R. Carnes Co., 2066 Helena street, Madison, Wis., is offering a new machine for cleaning sump tanks of all sludge, chips, coolant or old oil. It is said to do the job in 10 minutes.

Two models are being manufactured. One is a large unit called the 20-T which is entirely automatic in operation, and the other is a small unit known as the model 11-S designed for use with a regular 50-gallon drum.

A patented construction feature of these units is the elimination of excessive wear or clogging on the pump itself because none of the pumped liquid is permitted to pass through the pump. A sludge basket on the large model separates all the solids, chips and sludge from the liquid before it enters the 150-gallon storage tank.

Parts Washer

N. Ransohoff Inc., Cincinnati, announces a new single-stage washing machine for removing oil and chips from work such as machined shafts of standard or special shapes during inter-process operations. It also is adaptable for



cleaning other parts and can be equipped with perforated baskets for cleaning delicate small parts.

Outstanding feature of the machine is the special carriage which consists of V-shaped brackets. The section of the brackets which comes in contact with the work is lined with brass in order to prevent scratching highly machined surfaces.

Voltage Stabilizer

General Electric Co., Schenectady, N. Y., recently developed a new voltage stabilizer which provides a constant output of 115 volts from circuits varying between 95 and 130 volts. It is reported to be insensitive to load power factor and is not affected by variations in load from no load to full load or by

changes in power factor from unity to 0.8 lagging.

The unit is completely self-protecting, and will operate continuously throughout the range from open circuit to short circuit without damage. The new stabilizer, it is said, can be applied wherever close voltage regulation is requisite to good operation—electronic-tube apparatus, telephone apparatus, X-ray machines, photo-cell equipment, and in the calibration of meters, instruments and relays.

Light Projectors

Benjamin Electric Mfg. Co., Des Plaines, Ill., is offering new type RDS floodlighting projectors to help meet wartime needs for protective floodlighting and lighting of yards, areaways and other outdoor work places. These seamless steel housing units embody all features of the previous models with the exception all parts formerly made of aluminum, brass or other nonferrous metals are now furnished in steel or cast-iron specially treated by porcelain enameling, and other rust-proofing.

The new models retain the silvered mirror crystal glass reflector and other mechanical features of the previous projector.

Among these features are adjustability of the beam spread over the entire beam

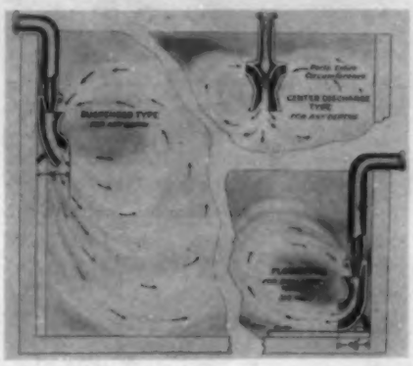
range from narrow to wide; special focusing mechanism to permit placement of light exactly where needed without waste; easy installation; provisions to facilitate maintenance and lamp changes.

Units are furnished with vertical and horizontal stops, which automatically reposition projector and eliminate need for resetting. The new RDS units are furnished in two models—RDS for 300 watt and 500 watt general service lamps or 500 watt floodlighting lamps.

Steam Jets

Duriron Co., Dayton, O., announces three new circulating steam jets of the corrosion-resisting type for use in tanks heating acid solutions, dissolving powdered or lump chemicals, and for the digestion of ores and separation of sludge acids These are said to fit snugly to

the inside walls of either square or circular tanks, with a maximum projection of 4½ inches. The suspended and center discharge types, according to Duriron, may be used in tanks of any



depth. The floor type is adaptable for tanks of any depth up to 60 inches. All are designed to give complete agitation and circulation of the tank contents.

Automatic Bucker

Aero Tool Co., Burbank, Calif., recently developed a new automatic bucker which both bucks and rivets simultaneously. It enables one woman to do the work that would otherwise require two operators in riveting airplane and other sheet metal parts.

Primary advantages claimed are extremely light weight and ease in handling. The bucker with 22-inch throat weighs but 145 pounds, and with 36-inch throat only 16 pounds, including gun. Both can be used with any standard rivet gun and can be furnished with specially designed heads for any type of aircraft construction.

Due to the construction of this tool, rivets are driven instantly in perfect alignment. Parallel yokes provide for side panels, wings and leading edges, with yokes for engine cowling and other parts requiring extra clearance.

On horizontal structures rivets can be pre-loaded. On vertical structures rivets are inserted in the usual manner or can be pre-loaded and taped. Opening and travel of bucking bar are limited only by the accessibility of the part to be riveted.

Reinforced Gloves

Industrial Gloves Co., Danville, Ill., reports the adaptation of one of its reguarl steel reinforced gauntlets for use by women who are required to handle rough, sharp, jagged materials in their war jobs.

Designed on a small comfortably fitting pattern, the gauntlet is made of sturdy chrome tanned leather, reinforced on all wearing surfaces with steel ribbons—diagonally placed for utmost protection against cuts and snags.

All seams are sewed closed with steel thread. The thumb wearing surface and the junction of palm and thumb are reinforced with extra leather and steel ribbons for added protection and wear. It is offered with 2-inch band instead of gauntlet, if preferable.

Testing Fixtures

Fellow Gear Shaper Co., Springfield, Vt., recently placed on the market two new devices for checking gears. One of these known as a cone-pointed testing fixture, illustrated, is for checking concentricity of the pitch circle; the other is for checking the circular pitch, or tooth to tooth spacing. Both fixtures have a maximum capacity for gears up to 12 inches pitch diameter, the maximum distance between centers being 15 inches.

Fixtures comprise a base upon which three adjustable brackets are mounted. Two of the brackets carry the work-holding centers; and the third bracket, which is located at right-angles to the brackets carrying the centers, retains the measuring pointers, fingers and dial in-

dicator, as well as the indexing mechanism.

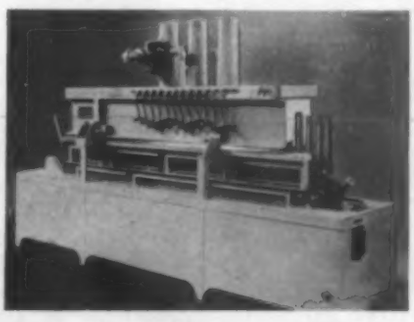
Head and tail-stock brackets are provided with clamping levers. The spindles carrying the centers are adjusted through a rack and pinion, and are clamped by levers. The bracket carrying the measuring pointers can be located in two positions, which together with the adjustable spindle, will handle any gear within the capacity of the fixtures. A work-indexing device is connected to the lever operating the pointer holder, which on the return stroke automatically indexes the work. Indexing fingers are adjustable for different pitches and numbers of teeth.

On the circular-pitch testing fixture, the spindle carrying the locating and measuring fingers is provided with a graduated collar at the rear end, so fingers can be set normal to the helix, if desired when checking helical gears. The "measuring" brackets for cone-point and circular-pitch testing are interchangeable on the same basis. Both fixtures are for bench use.

Heat Treating Machine

Selas Co., Philadelphia, now is offering a localized heat treating machine for mouth-end annealing of steel cartridge cases by radiant gas heat. It handles cartridge cases in sizes of 37 to 105 millimeter continuously.

Each cartridge case rotates about 15 times on an individual spindle during its transit through the annealing tunnel, so uniform preheating, heating and cooling is achieved over the desired area. In the unit shown the tunnel is lowered sufficiently to anneal the metal down to a



point several inches below the mouth opening. Flame does not impinge directly upon the cartridge cases, and discoloration is reported by users to be reduced to a minimum. Scaling is prevented because work is surrounded by combustion products rather than air in all hot zones.

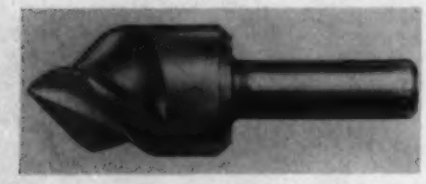
The 24 burners of the unit are staggered and each features a built-in needle-valve input adjustment. Thus, heat inputs at various points may be independently adjusted and balanced to suit the heat distribution pattern desired on the work.

Consumption of fuel in model shown amounts to 750 cubic feet per hour of natural gas, or 1400 cubic feet per hour of manufactured gas. The primer-cup end of each cartridge case remains cool at all times because of speed and localization of heating over the portion annealed, the corrugated asbestos heat baffle immediately below the tunnel, and the contact of the primer-cup end with the cold metal mass of the spindle upon which it rests.

In a 90-inch tunnel, for example 18 inches are devoted to preheating, 36 inches to full firing, and 36 inches to confined cooling. One cartridge case is annealed every 2 seconds. Annealing tunnel is removable. It is supported by jackscrews and positioned by longitudinal and transverse adjusting screws. The conveyor mechanism is adjustable for speed, is hand loaded and driven by a ½-horsepower motor.

Countersinks

Schrillo Aero Tool Engineering Co., Los Angeles, reports refinements in the design and manufacture of its spiral



fluted countersinks and counterbores permits them to be sharpened repeatedly without sacrifice of cutting efficiency. Both countersinks and counterbores feature hardened and ground shanks that are unaffected by chucks or wear. Special spiral design of these cutters provides superior chip clearance, the company states.

Iron Cores

Stackpole Carbon Co., St. Marys, Pa., announces new iron cores for use up to 150-175 megacycles. Combining a permeability of approximately 5 with high Q, the new iron cores are of materials recently developed by the company. Cores are being offered in practically every type for frequencies up to 50 megacycles.

Protector Helmets

Strauss Co., 970 Ewart building, Liberty avenue, Pittsburgh, announces a new line of "protector helmets" for factory women, comparable to those for men. These are of one-piece molded vulcanized fiber featuring seamless crown of great strength and light weight.

To reinforce the helmet a second piece of pre-formed fiber is used on the underside of the crown. The helmets for

women weigh approximately 25 per cent less than those for men. Instead of the usual lining, they are provided with a hammock which rests directly upon the wearer's hair, insuring unusual comfort. The head protector is held in place with an adjustable chin strap.

Torque Wrench

Tubing Seal-Cap Inc., 215 West Seventh street, Los Angeles, announces a new snap-acting torque wrench which gives both an audible and physical signal when the proper predetermined torque load is reached. Offered under the trade name Livermont Torq-Snap it requires no visual attention to operate for no dials or indicators are involved. When set to the predetermined torque load the wrench gives a high-pitched audible "click" accompanied by a definite physical sensation transferred to the operator's hand.

Designed primarily for applying proper load to tubing B nuts in aircraft plumbing the wrench is said to eliminate danger of pinching off or weakening flares. Simple in design, it works on the principle of a spring bar deflection. The deflection in the main bar bends a secondary spring which snaps over center when the proper load for which the wrench is pre-set has been reached. This causes a

slight drop in the torque curve, makes a "click" and actuates a "button" in the handle giving a physical signal in the palm of the operator's hand. This double indication also makes it practical to operate the wrench in restricted areas where indicators or dials are impossible to be seen, it is said.

Airport Switches

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is offering a new line of switches for control of airport runway lighting, including the runway and brightness selector switch. Similar in appearance and construction, both types incorporate mechanically interlocked preset switches. The two switches are usually a component part of the control desk or panel located in airport control rooms and towers.

The runway selector switch consists of a 2-stage rotary unit having adequate contact capacity to handle all control requirements. Mechanically interlocked with the selector switch are two double pole, single throw, preset switches wired to permit the operation of (1) the contact lights along any runway; (2) any group of floodlights; or (3) any group of floodlights and the correspoding runway contact lights, as desired.

The mechanical interlocking device locks the selector switch in the position last selected, so that runway selection of flood and contact lights cannot be changed until the selector is de-energized by turning the preset switches to the "off" position, thereby extinguishing contact and flood lights. Where switches are mounted on facsimile maps showing the actual runway layout, the switch handle can be oriented with the map, and will point to the actual direction of plane landing or take-off.

The brightness selector switch is a five position switch for selection of five stages of brilliancy of the runway contact lights. Located adjacent to, and mechanically interlocked with this switch, is a double-pole, single-throw spring return latch switch, with spring return to the "lock" position. This device fixes the selector switch in a definite position and locks it in the position of brilliancy last selected, until lock switch is turned to "open" and the contract lights extinguished.

Unmatched B&W facilities

PRODUCE UNMATCHED MECHANICAL TUBING

The ever-growing use of Babcock & Wilcox Seamless Mechanical Tubing was foreseen. B&W was ready with plant, equipment, and personnel. Today, B&W capacity to produce mechanical tubing is three and one-half times greater than it was but a few years ago.

Newly installed equipment includes additional drawbenches, one of them among the largest in the country. Greatly enlarged facilities expedite sandblasting, grinding, pickling, annealing, tempering, straightening, and other finishing operations. Far from least is the new laboratory—for intensified research to keep B&W Mechanical Tubing unmatched.

Much of the saving of time and steel achieved by the use of mechanical tubing depends on use of the right size, alloy, and temper. As the largest producer of specialty tubing and pioneer in alloy steel tube production, B&W can materially help designers choose the right tubing for any given purpose. Opportunities to serve in this manner will be welcomed.

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TA-1234

ROEBLING *Wires*

ROUND . . . FLAT . . . SHAPED

Are your war-production facilities being tied down by the need for processing materials before "getting down to business"? Let Roebling supply you with flat, round or shaped wires . . . and see how much more of your manufacturing time can go into actual *final* fabrication and assembly of products for Victory.

Roebling Flat Wire for surgical instruments is a good example of how this Roebling service works out. Rolled to customer's exact specifications, this high grade, high carbon steel is ready "as-delivered" for final shaping with a minimum of operations, speeding manufacture, putting more instruments into Army surgeons' hands to save soldiers' lives . . .

Giving this kind of service in wire making and wire finishing is a war job that Roebling's exceptional facilities and skilled personnel alone make possible. Put your tough wire problems up to Roebling. Prompt action on war orders.

JAR ROEBLING

JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY — Branches and Warehouses in Principal Cities

Doing a Bigger Job

(*Continued from Page 67*)

being wrapped with paper instead of rubber. Linoleum replaces rubber in telephone booth floor mats. "Presdwood" now goes into terminal strips, wood into telephone booth kickplates. Biggest single rubber saving of all has been effected by reducing by half the amount of "crude" in drop wire insulation—saving since the change was introduced: 185,000 pounds.

Continuing the picture of nonmetallic alternatives, cotton fabric ("leno" cloth) has replaced burlap in wrapping certain types of buried cable. Cellulose-acetate rayon yarn is used instead of silk in switchboard wire.

Perhaps the most interesting of all "alternative" stories involves phenol fiber. This insulating material, used in great quantities in telephone exchanges, contains cresylic acid, a chemical now "drafted" for war use. In their quest for an alternative, engineers came upon a lignin resin plastic made from waste sulphite water from the manufacture of paper pulp. For years pollution of North American waterways by sulphite water had been a major problem with pulp and paper manufacturers. Today the use in telephone manufacture of the lignin resin plastic derived from this waste cuts Western Electric's use of phenol fiber by about 40 per cent.

All in all, alternatives have replaced strategic materials in more than 1000 *parts involved in telephone manufacture.* When you add all these instances together, when you take into consideration, too, the necessary reduction of the system's construction program, you find that the annual rate of use of aluminum has been cut by 90 per cent, crude rubber usage has decreased by 80 per cent, zinc by 75 per cent and copper by 70 per cent. During this same interval, the system's construction program has fallen off by about 25 per cent.

In the long run, however, it's impossible to freeze the whole alternatives program in statistics — the picture changes constantly. Not infrequently, essential materials gain the "critical" status on short notice, making coordinated efforts and rapid action imperative. Often the introduction of an alternative calls for changes in design, a problem complicated by shortages of skilled toolmakers and toolmaking facilities. Then, too, there is the problem of re-substitution: alternative materials themselves have—in more than one instance—appeared on the critical list a few short months after they had been introduced into Western Electric manufacture.

To cope with multiplexities of the conservation program, the system early

in 1941 set up an intercompany committee consisting of H. S. Osborne, American Telephone & Telegraph Co.'s plant engineer; D. F. G. Eliot, Western Electric's general purchasing agent; R. L. Jones, director of apparatus development, Bell Telephone Laboratories; and Stanley Bracken, W. E. vice president and general manager of manufacture.

Behind this committee stands the full Bell system corps of engineers, mobilized for combined attack on the materials problem. It's the job of Bell laboratories engineers to consider the technical questions involved and to pass on the suitability of the alternative materials available. Western Electric manufacturing engineers review the parts affected by the shortage in question, make an inventory of available supplies, discuss manufacturing problems with their colleagues from the laboratories and, upon agreement, revise manufacturing information accordingly. Western Electric's purchasing department places new orders immediately, revises outstanding contracts, makes every effort to insure a smooth influx of the new material. At Western Electric works locations, engineers make prompt arrangements for the new materials to go into stock, and as swiftly adapt operations to the new manufacturing techniques required.

Reclamation: In dire need of metals for war, America today looks to her scrap heaps and junk yards as veritable "mines above ground" which, if tapped, will yield ton upon ton of metal to feed the reclamation furnaces and, in turn, our gigantic war arsenal. For many years, however, Western Electric has been tapping the huge above-the-ground mine of obsolete and worn-out telephone equipment, of machine scrap and rejected parts from its own manufacturing operations.

Removed from service, obsolete and worn-out equipment is collected and sorted in Western Electric's distributing houses, and then—for the most part—goes to Western's wholly-owned subsidiary devoted to reclamation of nonferrous metals, the Nassau Smelting & Refining Co. on Staten Island, New York.

In Nassau's fiery furnaces this old equipment is melted down to yield ingots and pigs of brass, bronze, babbitt, solder and other essential metals and alloys. Much of Nassau's production returns to Western Electric to be fabricated once again into instruments of communications. Nassau solder is in almost universal use throughout the system—3,000,000 pounds of it last year—while Nassau bronze now goes into propellers for naval and merchant craft, Nassau brass into ship fittings and ordnance parts.

In an average year the Nassau Smelt-

Amazing efficiencies result

when all movement of materials in different departments

is coordinated by one centralized authority

implemented with **TOWMOTOR**

ARMY E NAVY

THE 24-HOUR ONE-MAN-GANG

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STRAIGHT—GAS POWERED INDUSTRIAL TRUCKS EXCLUSIVELY—SINCE 1919

ing & Refining Co. returns to Western Electric a total of 48,000,000 pounds of reborn metal. Nassau's 1941 production, augmented by deliveries to outside customers, came to nearly twice that amount.

Nassau, too, is responsible for the disposition of much of the system's scrap iron, paper, rubber and other by-products of telephone operation. The company employs more than 400 people, including a staff of metallurgical engineers whose tests control a quality output.

Nassau is not Western Electric's only metals reclamation plant. In its own works the company maintains furnaces for the reclamation of machine scrap—the punch press skeletons, the chips from milling operations and the other odds and ends of metal that are the inevitable by-products of metals fabrication. There's only a trickle of scrap from each machine, but multiply that trickle by the thousands of W. E. metal-working operations and you get a swelling stream of essential metals.

But miscellaneous metals, no matter how huge the volume, are relatively worthless until they are sorted according to grade and kind. *Western Electric segregates its scrap at the source—at the machine.* Carefully marked bins are available for each grade and type of metal. In the metals manufacturing plant this scrap metal is re-melted, refined, re-cast, rolled and shaped into strips of metal ready for fabrication once again.

No reasonable quantity is too small to reclaim. Here's an example. The acid baths used to remove the oxide coating from newly-made copper rod removes, too, an infinitesimal amount of copper from the surface of the wire. After several runs, however, the bath grows rich in copper, copper which Western reclaims by electrolytic processes. Copper reclaimed in this fashion runs to many tons in the course of a year.

Repair and Re-use: What of apparatus not obsolete but which had been removed from service because of the failure of a single part? Here again Western Electric distributing houses move to the forefront of the Bell system's war on waste. In the 29 equipment supply centers serving system operating companies, shop employes disassemble telephones and other apparatus, remove and replace ailing parts and return the equipment to the operating companies for a new term of service.

Emergency Engineering: Programs for Bell system expansion have—until today—been figured in long-range terms. For instance, it seemed but common-sense economy to engineer central office construction with a view to expansion over a period of years. But war has changed all that. Perhaps it will cost more to provide switchboard additions to meet requirements of a period of only a year, but it saves copper—and saves it now. It may cost more to install a small instead of a larger cable where indications point to the necessity of installing another small one a year or so hence, but it saves metal when it's most badly needed.

New Telephone Techniques: The habit of long-term thinking is paying dividends, none the less, in another phase of the Bell system's program to do much with little. The fundamental researches of the Bell Telephone Laboratories in the interests of an improved service have yielded new techniques by which the system can carry a heavier load than ever before with a minimum expenditure of metals. "Carrier" telephony is one example.

"Carrier," a technique by which several conversations may be sped over the same pair of wires at the same time, has been the object of continuing development for a quarter-century, and had seen commercial use for many years before the war. Today multi-channel telephony is playing an important part in reconciling shortages of materials with an unprecedented demand for more and more long-distance voiceways.

Type "K" carrier, for instance, can carry as many as 12 conversations over two pairs of cable wires and, best of all, can frequently be installed on existing cables, multiplying their efficiency many times without significant expenditure of copper. So great, indeed, are the copper savings effected by carrier telephony that if the total carrier circuit mileage expected to be placed in operation at the end of the year were to be duplicated by ordinary open wire and cable construction, *between* 300,000 *and* 400,000 *tons of additional copper would be required.*

Another copper-saving product of Bell Laboratories research, the coaxial cable, can carry as many as 480 *simultaneous conversations* by the carrier technique. The wire-within-a-tube construction of coaxial involves far less copper than conventional cable capable of carrying a comparable load.

None of the Bell system's conservation measures is merely a blind substitution; all are products of co-ordinated organization and the "know how" of long experience. Peacetime precautions against waste are paying real dividends in wartime.

By corollary, the experience gained in the test and trial of wartime operation will just as surely pay dividends in the form of improved service and economy after the war. Many of the alternative materials, having proved their efficiency and economy, are winning a permanent place in telephone manufacture.

Cartridge Case Dies

(*Continued from Page* 96)

Inside Diameter Grinding: Grinding the inside diameter of tungsten steel dies has been a source of trouble to many concerns. While both silicon carbide and aluminum-oxide abrasive have been used with some measure of success, they cannot be considered entirely satisfactory for production grinding. If the wheels are hard enough to prevent rapid breakdown thus making it difficult to grind a straight hole, then they are apt to glaze and refuse to cut freely.

The objections to vitrified bonded wheels appear to have been overcome by the diamond resinoid bonded wheel developed for grinding cemented carbides but found to be equally efficient and economical for bore grinding of tungsten steel drawing dies.

For rough grinding, a 100-grit diamond wheel, designated "100S-B100," is recommended. Although the initial cost of a diamond wheel is considerably greater than that of a vitrified bonded wheel of the same size, it more than pays for itself by reason of its greater stock removing capacity and its much longer life when used under proper conditions.

Following are a few suggestions and precautions that should be observed when using the diamond resinoid bonded wheel for rough grinding the bores of tungsten-steel drawing dies:

—Operate wheels up to ½-inch diameter at approximately 25,000 revolutions per minute and wheels from ½ to ¾-inch diameter at approximately 12,500 revolutions per minute.

—Operate the work at approximately 400 revolutions per minute.

—Indicate the periphery of the diamond wheel to run true within 0.0005-inch before starting to grind.

—Use slip collets for rapidly mounting and accurately holding the die while grinding.

—Grind wet, using plentiful supply of coolant (any standard soluble oil in 80 to 1 concentration). Greasy solutions should be avoided as they smear the wheel face and retard the cutting action.

—Use a wheel spindle of as short a length and as large a diameter as practicable.

—Use a relatively slow traverse of 20 to 40-inches per minute.

—Frequently dress the 100S-B100 diamond resinoid wheel lightly with a piece of pumice or a fine, soft silicon-carbide abrasive stick, such as Norton 37320-G Crystolon stick.

Most plants manufacturing straight and tapered-hole dies allow approxi-

mately 0.003-inch for grinding after heat treating. The shrinkage during heat treating is very little if it is properly controlled. It is advisable to leave at least this much stock for grinding to insure removal of all boring tool marks.

Finish Grinding: For this operation, the Norton 500-B 50 diamond resinoid bonded wheel is recommended. While used in the same manner as the 100-grit diamond roughing wheel, the 500-grit finishing wheel should not be thought of as a stock removing wheel in any manner and should not be expected to remove more than 0.0005-inch from the diameter to bring the hole to size.

Final Finishing: Although an exceedingly high finish can be obtained from the 500-grit diamond wheel, some radial scratches are apt to be left and these must be removed.

Aluminous abrasive flours in 600-grit and finer are being used in some plants for lapping to produce the required finish. The laps themselves are usually cast iron used with a medium grade lubricant oil as the lapping vehicle.

Some concerns also are using Norton resinoid-bonded diamond honing sticks in 220, 320 and 500-grit sizes.

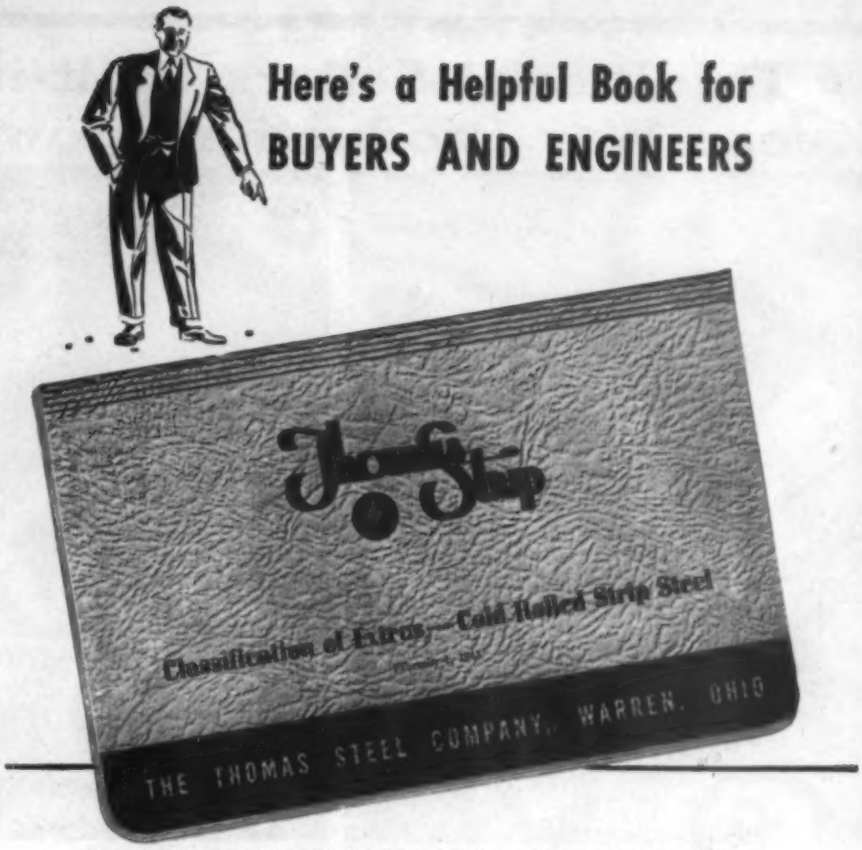
Fine Finishing — Stationary Wheel: There are usually four small sticks in a set, the size depending on the size of the die bore. These sticks are mounted in a simple expanding type holder which in turn is rotated in an ordinary drill press. A plentiful supply of light machine oil should be used as a lubricant.

A typical setup for fine finishings of dies employs a 500-grit diamond resinoid wheel, complete marking 500-B50. The wheel does not revolve and is applied in the same manner as a honing stick, with light pressure.

The device operating the wheel is an electric portable honing tool with a rapid reciprocating action and a ⅛-inch stroke. The tool is clamped firmly to the wheel head of the grinder or other machine, after it is first accurately positioned with respect to the die bore.

The die is chucked in a slip collet which encases its entire length and is revolved at approximately 150 revolutions per minute. Here again, a heavy flow of any light machine oil should be pumped through the back of the die in order to keep it cool, flush away the chips and insure a finish with a high lustre.

The wheel head is traversed slowly in and out at the same time that the honing tool is reciprocating and the die is revolving. By this finishing method, plants have been able to obtain surface finishes better than 3 microinches in a matter of a few minutes.



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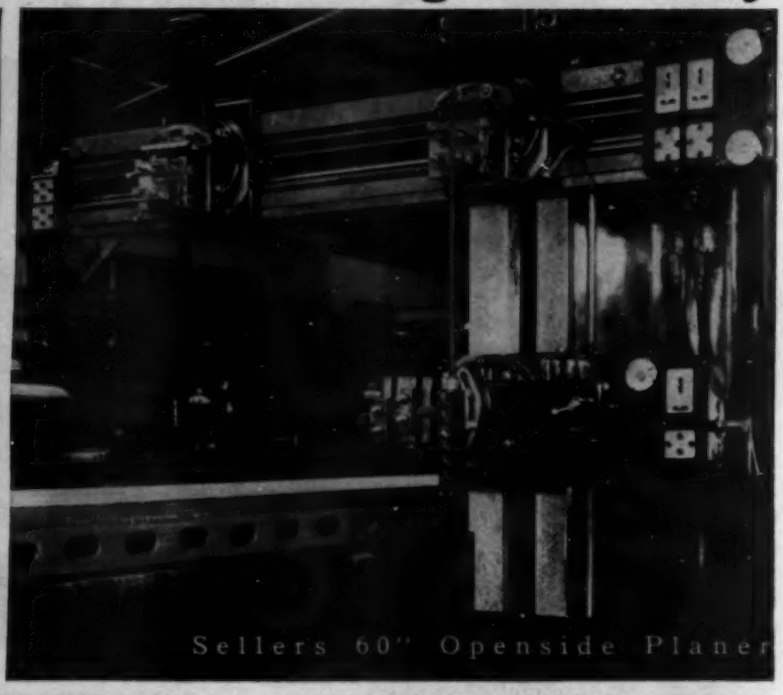
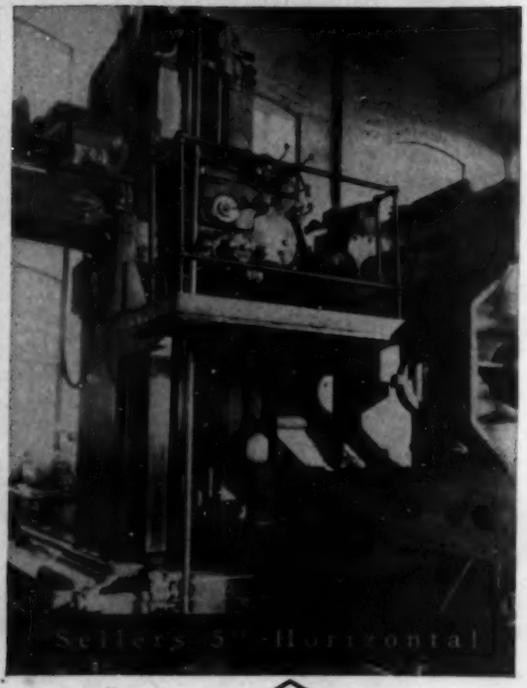


Sellers 60" Openside Planer

Sellers Car Wheel Lathe



Sellers 5" Horizontal

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1622 Hamilton Street, Philadelphia, Pa.

Sellers

Steel Deliveries Tighten Under Heavy CMP Orders

April output well covered in most products. . . Tin plate needs set far above normal production. . . Scrap goal increased to 25,000,000 tons to meet full steel needs

DEMAND
Maintains heavy backlogs.

PRODUCTION
Advanced ½-point to 99½ per cent.

PRICES
Generally steady.

SELLERS of steel bars, sheets and strip now have little to offer for April delivery, even on Controlled Materials Plan allotment numbers.

The situation is tightening rapidly and so heavy have been CMP orders and validation of earlier orders under the new system that some mills have difficulty knowing where they stand and are running behind in acceptance or rejection of orders. The bar position is particularly tight, with serious doubt whether bars of any size could be delivered in April against a current CMP allotment, which takes precedence over a PRP rating.

Plate production continues to meet essential demands and a new record is forecast for March, estimated at 1,200,000 tons by conservative observers and as high as 1,300,000 tons by the more sanguine. Shipyards, both private and naval, are well supplied with plain and partly fabricated material to meet the increased programs now under way.

Tin plate production in second quarter is expected to exceed 690,000 net tons, about 605,000 tons for domestic use, 60,000 tons for lend-lease and the remainder for the Board of Economic Warfare. This would be at a rate of about 60,000,000 base boxes per year, considerably exceeding normal output.

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Cold-drawn steel producers are unable to accept all business offered as their supply of hot-rolled bars is not sufficient, though some bessemer material has been added to their quotas. Deliveries on current orders are nine to ten weeks on carbon steel and a month longer on alloys, in most cases. Ordnance production in the Chicago and Detroit districts is causing inquiry from that section to producers in the East.

Heavy specifications are being filed for nuts and bolts, especially in larger sizes, shipbuilding, dry docks and pier construction being large users. The Navy is also in the market for large quantities.

Fluorspar shipments in 1942 were 12 per cent greater than in 1941, steel mills being the largest users. Production was 8 per cent greater than in the prior year, the larger increase in shipments being made from stockpiles.

Pig iron supply is easier and some reserves are being built up, preparing for diminished output as blast furnaces go down for relining, a larger number being expected to need repair this year than last, as a result of hard driving over the past few months. New stacks to be completed this year will be an offset to this condition.

Steel production last week regained the half-point lost the week before and returned to 99½ per cent of capacity. Pittsburgh gained another point to 101 per cent, highest since March, 1942, when 103 was attained. Wheeling rose 4 points to 88½ per cent, Cincinnati 3 points to 88, St. Louis 3 points to 91, Detroit 1 point to 92, Youngstown 1 point to 98 and Cleveland 2½ points to 95. Chicago dropped 2½ points to 98½ per cent on revision of its capacity basis and New England receded 3 points to 92 per cent. Rates were unchanged at Buffalo, 90½ per cent, eastern Pennsylvania, 95 and Birmingham, 100.

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A new urgency list classification for machine tools has caused revision of delivery schedules, most tools given preference being for the aircraft industry. Shipments are heavy, exceeding current orders in many types, but backlogs are heavy. Better performance by subcontractors is shortening assembly time and speeding delivery.

Government agencies have increased estimates of needs for purchased scrap to 25,000,000 tons for this year, from 21,000,000 tons estimated earlier. This compares with 27,000,000 tons moved last year.

Some progress is reported in processing borings and turnings through blast furnaces, resulting in pig iron with a uniform alloy content, which can be used in the open hearth with definite analysis knowledge impossible to obtain when the material is charged direct.

The scrap position continues easy, some melters maintaining top steel production and at the same time adding to reserves. Quality of deliveries is better, as a larger proportion of industrial scrap is coming out and rejections are fewer than a few weeks ago. Lack of labor continues a choke point and some important yards are operating as low as 50 per cent of capacity.

Average composite prices of steel and iron products show no change, Office of Price Administration ceilings prevailing throughout. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17

COMPOSITE MARKET AVERAGES

	Mar. 20	Mar. 13	Mar. 6	One Month Ago Feb., 1943	Three Months Ago Dec., 1942	One Year Ago Mar., 1942	Five Years Ago Mar., 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.92
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	13.40

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	March 20, 1943	Feb., 1943	Dec., 1942	Mar., 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.30
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to $\frac{9}{32}$-inch, Pittsburgh	2.00	2.00	2.00	2.00

Pig Iron

	March 20, 1943	Feb., 1943	Dec., 1942	Mar., 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.365
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.24
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.39

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$6.50	$6.15	$6.00	$6.00
Connellsville, foundry ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $36 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.35c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.6?c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.35c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.
Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Pheonixville, for export.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Wire Products to the Trade:	
Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

	Butt Weld					
	Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

	Lap Weld					
	Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		—Seamless—		—Lap Weld—	
O. D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base. per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	...	...
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.
Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine	
⅛ x 6 and smaller	65½ off
Do., ¼ and ⅜ x 6-in. and shorter	63½ off
Do., ⅝ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off
Stove Bolts	
In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.	
Nuts	
Semifinished hex.	U.S.S. / S.A.E.
⅞-inch and less	62 / 64
⅛-1-inch	59 / 60
1⅛-1½-inch	57 / 58
1⅝ and larger	56 / ..
Hexagon Cap Screws	
Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off
Square Head Set Screws	
Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago. Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, furnace	*$6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	8.00
Wise county, furnace	7.00
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.30
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943. †$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del	25.00	24.50	26.00	25.50
Birmingham, base	‡20.38	‡19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.75	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‖Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

•Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. ‖For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, ▲Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.54

(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases $59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 3100 series
Boston	3.98[1]	3.85[1]	3.85[1]	5.68[1]	3.71[1]	4.06[1]	5.06[1]	5.11[24]	4.68[24]	4.18[22]	3.46	7.75[20]	6.05[20]
New York	3.84[1]	3.75[1]	3.76[2]	5.56[1]	3.58[1]	3.96[1]	3.96[1]	5.00[12]	4.60[1]	4.09[22]	3.51	7.60[20]	5.90[20]
Philadelphia	3.85[1]	3.55[1]	3.55[1]	5.25[1]	3.55[1]	3.95[1]	4.45[1]	4.90[24]	4.63[22]	4.06[22]	3.31	7.56[22]	5.86[20]
Baltimore (city)	3.85[1]	3.70[1]	3.70[1]	5.25[1]	3.50[1]	4.00[1]	4.35[1]	5.05[17]	5.00[20]	4.04[22]	...	...	...
Baltimore (country)	3.85[1]	3.70[1]	3.45[1]	5.25[1]	3.25[1]	4.00[1]	4.35[1]	4.75[17]	5.00[20]	4.04[22]	...	...	...
Washington, D. C.	3.95[1]	3.80[1]	3.80[1]	5.35[1]	3.60[1]	4.10[1]	4.45[1]	5.15[17]	5.10[20]	4.03[22]	...	...	...
Norfolk, Va.	4.00[1]	4.05[1]	4.05[1]	5.45[1]	3.85[1]	4.10[1]	4.10[1]	5.40[17]	4.50[24]	4.15[22]	...	...	...
Bethlehem, Pa.*	3.45[1]	...	...	...	...	...	...	...	...	...	...	...	...
Claymont, Del.*	...	...	3.45[1]	...	...	...	...	...	...	...	...	...	...
Coatesville, Pa.*	...	...	3.45[1]	...	...	...	...	...	...	...	...	...	...
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[18]	4.30[20]	3.75[22]	3.52	7.35[20]	5.65[20]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[18]	4.20[20]	3.65[22]	...	...	...
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[18]	4.00[24]	3.65[22]	...	7.45[20]	5.75[20]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[18]	4.00[24]	3.65[22]	...	...	...
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[18]	4.05[24]	3.75[22]	3.20	7.55[20]	5.85[20]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[18]	3.95[24]	3.65[22]	...	...	...
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[13]	4.30[24]	3.80[22]	3.40	7.67[20]	5.97[20]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[18]	4.77[24]	4.42[22]	...	...	...
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[18]	4.77[24]	4.42[22]	...	...	...
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[18]	4.37[24]	4.00[22]	3.45	7.69[20]	5.99[20]
Youngstown, O.*	...	...	...	...	...	...	...	4.40[12]	...	...	...	...	...
Middletown, O.*	...	...	...	...	3.25[1]	3.50[1]	3.50[1]	4.40[12]	...	...	...	...	...
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[18]	4.10[24]	3.75[22]	3.50	7.35[20]	5.65[20]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[18]	4.00[24]	3.65[22]	...	...	...
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[18]	4.23[24]	3.88[22]	3.54	7.33[20]	5.88[20]
St. Paul	3.75[3]	3.80[3]	3.80[3]	5.40[3]	3.50[3]	3.85[3]	3.85[3]	5.00[3]	4.35[3]	4.34[22]	3.83	7.70[20]	6.00[20]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[18]	4.24[24]	4.02[22]	3.61	7.72[20]	6.02[20]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[18]	4.25[24]	3.97[22]	...	...	...
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[18]	4.00[24]	3.97[22]	...	...	...
Memphis, Tenn.	3.90[3]	3.95[3]	3.95[3]	5.71[3]	3.85[3]	4.10[3]	4.10[3]	5.25[11]	4.66[24]	4.31[22]	...	...	...
Birmingham (city)	3.50[3]	3.55[3]	3.55[3]	5.83[3]	3.45[3]	3.70[3]	3.70[3]	4.75[18]	4.78[24]	4.43[22]	...	...	...
Birmingham (country)	3.40[3]	3.45[3]	3.45[3]	5.83[3]	3.35[3]	3.60[3]	3.60[3]	4.75[18]	4.78[24]	4.43[22]	...	...	...
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[26]	4.95[19]	4.60[22]	3.00	...	...
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[26]	4.95[19]	4.60[22]	...	...	...
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.75[3]	4.30[3]	4.30[3]	5.25[23]	5.43[19]	4.50[22]	...	...	...
Los Angeles	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[19]	7.15[5]	5.70[22]	...	9.55[20]	8.35[20]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[19]	7.55[19]	5.55[22]	...	9.80[5]	8.80[5]
San Francisco (country)	3.85[1]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[19]	7.45[19]	5.45[22]	...	...	...
Tacoma	4.20[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.25[8]	5.45[8]	5.70[8]	6.65[24]	5.75[22]	...	...	...
Seattle (city)	4.20[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.35[8]	5.45[8]	5.70[8]	6.65[24]	5.75[22]	...	...	8.00[5]

*Basing point cities against which warehouses equalized freight as of April 16, 1941, and which must now be used in calculating lowest combination prices.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendment No. 10 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, any quantity is base.

Ores

Lake Superior Iron Ore
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50

less $7 freight allowance

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	...	...
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.15-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9253	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	...	...
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	...	...
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9587	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per 100 lb., on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semifinished. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: When shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the 'corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip . . .

Sheet & Strip Prices, Page 110

Virtually all sheet sellers are booked through April and on some grades well into May. Meanwhile, CMP is increasingly effective, not only in percentage of new orders, but in validating old orders on the new basis. The trend in the latter respect has been accelerated by the increasing understanding that it is not the date that an order was entered under the old rating system, but the date it is brought under CMP that is important in obtaining preference. In other words, an old order entered previously under PRP has no preference over a new order under CMP, even if validated at the same time the new order is entered. In this case, both orders receive precisely the same standing, it is pointed out.

As a result, there have been some cancellations within the past few days, as buyers with old contracts realize there is nothing to be gained by holding the original order dates.

Orders for narrow cold-rolled strip are geared to productive directives; more CMP tonnage with allotment numbers is appearing and most of the 30 per cent of second quarter requirements for April delivery will be shipped. With annealing a choke point, rerollers are operating from 85 to 90 per cent of capacity as a whole; demand for cartridge cup steel remains heavy, but with some decline in strip needed for clips and links. While numerous specifications have been changed, allowing the use of carbon steels instead of alloys, demand for the latter is fair, notably the NE 9400 series.

Plates . . .

Plate Prices, Page 111

Due to the allocation system under which plates have been handled for months, it is pointed out that CMP will not figure prominently in April rollings, schedules for which were set up early this month. With plate mills now receiving an increasing number of orders under CMP, with rerating of old orders, the new plan should have an important bearing on May schedules.

With ship production at an all-time high and with construction scheduled to expand still further plate production this year will reach a new level. This month, in fact, is expected to establish a new record, at least 1,200,000 net tons, according to the more conservative estimates, and possibly 1,300,000 tons, the goal set by Washington at the beginning of March.

However, shipyards, by far the principal consumers of plates, are generally regarded as having a good backlog. A portion of this tonnage, it is pointed out, has been partially fabricated and for that reason does not appear in stock inventories. Nevertheless, tonnage actually on hand at merchant yards in one form or another is estimated to be ample for all requirements on the basis of the new record at 130 merchant ships built in February. Moreover this backlog tonnage is believed to be well distributed among all merchant yards.

The new status of navy yard stocks is not known, but trade opinion is that supplies are relatively as heavy, if not heavier, than stocks of merchant yards. However, one factor to be taken into account in this connection is that the

When fliers take to boats they use a deep-drawn cylinder

This cylinder is only one of many and varied Hackney deep-drawn shapes now in active war service. Not only does deep drawing assure an improved product, but it also effects considerable savings in material, man-hours and equipment.

Fliers forced down at sea use a deep-drawn cylinder to inflate rubberized boats which keep them afloat until rescued. The inflation is accomplished by compressed carbon dioxide stored in the deep-drawn lightweight cylinders.

Here, as in countless other war products, the Hackney deep-drawn process has met the requirements necessary to produce the unit to aviation specifications and meet war urgencies. In common with other parts used by aircraft, this cylinder must be light in weight. Hitherto, it was necessary to machine the cylinder down to specifications. Time is saved. Material is conserved—and considerable lathe equipment and needed machinists are released for other work.

The Hackney deep-drawn process assures uniform side-wall thickness. Electrically controlled heat-treating provides additional strength.

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Special Analysis Wire for All Industrial Uses

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navy yards, by virtue of the special character of their work do not consume steel as rapidly as other yards of comparable size.

Bars . . .

Bar Prices, Page 110

Average consumers of hot-rolled steel bars, without benefit of quota arrangement such as possessed by a cold drawer, find difficulty obtaining delivery in April, even when able to supply a CMP allotment number and proper certification. Trend toward CMP numbers is said to be shifting rapidly, even though some buyers, including large consumers, are putting orders through on PRP ratings.

In general small and medium-sized rounds no longer are available, even under CMP, for delivery under six to seven weeks, with larger rounds and flats not under ten weeks. Some buyers recently, by availing themselves of CMP, were able to obtain better promises than previously, but the delivery situation now has tightened again. It is doubtful if bars of any size could be delivered in April against new CMP allotment numbers, which take precedence over PRP ratings. Large rounds and flats are definitely out of the question for delivery in April.

Pipe . . .

Pipe Prices, Page 111

Demand continues to fall off for standard pipe in sizes from small water pipe up to heavy steam pipe, as a result of declining construction work. Demand for mechanical tubing remains consistently high, and aside from deliveries on federal pipe line projects, there is little activity in oil country goods. New aircraft programs now getting under way are causing heavy commitments for various sizes of mechanical tubing and some new production units are expected to go in shortly.

Rails, Cars . . .

Track Material Prices, Page 111

Freight car builders expect little domestic car inquiry for several weeks, railroads seeing no opportunity of getting deliveries on cars already placed, before third quarter. Cars on order are included in the 20,000 approved for first half construction but steel for this use has been placed only recently and most will be rolled in second quarter. Greatest scarcity now is in bars, mainly large sizes, and spring steel. Shapes and even plates, are said to be more easily obtainable.

Mass production of passenger and freight cars of standard designs is likely to be realized in the postwar period in the opinion of Ellis W. Test, assistant to the president of the Pullman-Standard Car Mfg. Co. Standardization would save railroads millions of dollars and has the approval of Joseph B. Eastman, defense transportation director. Light-weight cars are also an expected development, giving economy in operation by increasing payload for a given weight of equipment. Plans are being considered by most roads to install greatly improved passenger equipment after the war and most standard passenger cars are destined to

be scrapped and replaced by the newer types used in streamlined trains.

No announcement has been made as to the carbuilding program for last half but it is expected it will be for about the same number as in first half. Inasmuch as no box cars or tank cars were released for first half it is believed some of these types will be specified for the second period. Unusual demand on tank cars has caused heavy wear and replacements will be necessary. Specifications for cars for the Army are expected to be light. The program for 37,000 cars for this branch of the service is well under way and probably further building will be for special types to round out the program.

Rail rolling continues to be dependent on available time after demand for shell steel rounds has been met.

Structural Shapes . . .

Structural Shape Prices, Page 111

Liberalization policy has been put into effect by Conservation Division of War Production Board. As a result, many projects now pending which have been redesigned for mass concrete, wood or other substitute materials, can be redesigned to use steel where necessary and desirable, with reasonable assumption that the specifications will be approved. Demand continues light in structural markets and many fabricators are looking for business. This follows through not only in structural steel fabrication but in all other branches of construction, including roofing and window fabrication, heating systems and the like.

Shape buyers with CMP allotment numbers should have little difficulty in obtaining April rollings and even with a good PRP rating should get good delivery. In spite of the fact that steel is limited for this purpose demand is dull, due mainly to government building restrictions. Fabricators are concerned over difficulty in obtaining CMP certificates, as usually they are not prime contractors. Some fabricators have high-rated orders on books, such as high-test gasoline plant tonnage and subassembly work for the Navy.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 111

Reinforcing bar tonnage placed during February was lowest to date. Thus far in March the trend has been unchanged, with the exception of a few large jobs now pending and which may be placed before the end of the month. In virtually every appeal made by new billet steel producers to the War Production Board for permission to roll orders outside the limit specified for such mills, the request has been turned down. Rail mills report only scattered bookings and in small tonnages.

Pig Iron . . .

Pig Iron Prices, Page 112

Pig iron supplies are easier, some stocks being built up for important interests against possibility of reduced production resulting from necessity for

You wouldn't use a crane to change a tire...!

BY the same token a massive, heavy duty overhead crane should not be employed to do a job that can be done by a nimble Jib Mounted Crane.

The reasons are obvious. On duty at strategic points throughout your plant these active "little giants" with lifting ability up to 2000 lbs. and free rotary swing take over and carry on *after* major loads have been delivered via overhead. Thus overhead equipment is released for extra heavy duty. Production speeded up. Cost of operation reduced. Man-power conserved.

SWINGING BRACKET No. 539

Hand or electric. Swinging bracket. Lifting capacity ½ to 3 tons. Up to 20 ft. radius.

PILLAR TYPE No. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist. Mention desired height and length of jib when ordering.

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509 S. Byrkit St., Mishawaka, Ind.

blast furnace repairs later this year. More stacks are expected to go down for relining than last year, as a result of the hard driving in recent months.

Permission for larger output of agricultural implements and stoves has caused somewhat greater allocations to those interests. Foundries producing machine tool castings find skilled help more of a deterrent than lack of pig iron and scrap. Backlogs of these foundries are enough for steady operation for many weeks but in some instances new orders are fairly balanced by cancellations and the peak of this demand seems definitely past.

While there have been few requests for delays in pig iron shipments in the New York district this month so far, there is an easing in the melt.

The more appreciable letup among eastern pipe foundries generally is being reflected in that district to some extent. However, some of the difficulties in maintaining melt are ascribed to shortage of manpower. In certain instances backlogs have been reduced to the extent that some of the employes, including molders and some of the more highly skilled men, have left to take jobs in war plants where prospects for a sustained volume of orders appears more promising and where also in some cases wages are higher. District shipyards, in particular it is asserted, have attracted foundry workers for these reasons.

Scrap . . .

Scrap Prices, Page 114

Wider use of miscellaneous scrap, largely borings and turnings, is expected through greater resort to the blast furnace as a refining medium. Some pig iron makers already are processing turnings through the blast furnace, selling the resulting pig iron by analysis on a uniform alloy content. Other furnaces may take up this practice.

Difficulty in using alloy borings and turnings direct in the open hearth results from inability to determine the alloy content in a large proportion of the cases. By blast furnace refining a definite analysis is possible before the iron enters the open hearth.

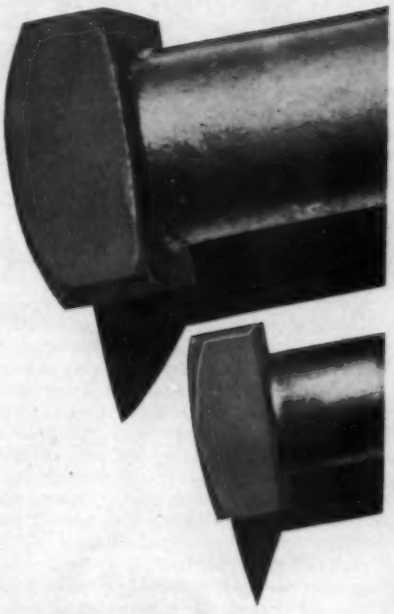
Scrap stocks of melters in the Pittsburgh district are in good position and tend to increase. Few rejections are noted as most scrap now moving is from industrial sources or is well classified general scrap. Dealers are handling slightly more tonnage, though collections by small yards are at a low point.

Scrap yards at Buffalo are working at only part capacity, due to lack of labor. Equipment, shears, presses and trucks, often stands idle for lack of operators. Some large yards are at only 50 percent of capacity. Physically handicapped workers are being hired in many instances. A higher wage rate is deemed necessary to obtain labor in competition with other employment.

Scrap receipts in the St. Louis district are irregular but somewhat improved and melters are well supplied. No. 2 heavy melting steel is relatively scarce and one mill is seeking further supply. Scrap is being received on allocation from Arkansas, Oklahoma and other points in the Southwest.

Cincinnati melters are receiving all the scrap they need and are not seeking remote tonnage, higher freight costs making it less desirable in the face of sup-

OLIVER BOLTS



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Hundreds of sizes and types of standard and special bolts, studs and cap screws are made by Oliver. Carbon steels, alloy steels, non-ferrous metals — heat-treated, galvanized or plated according to your needs. Cut or rolled threads, accurate shanks and heads.

OLIVER IRON AND STEEL Corporation
PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

plies nearer home. Confidence in the outlook is shown by actions of some consumers in reducing stockpiles.

Scrap consumers in eastern Pennsylvania are in need of more heavy melting steel than is available now, the shortage attributed in part to allocations of this grade, which are diverting it to the Pittsburgh and Valley area from New England and northern New Jersey. Normally much of this would go to the Philadelphia and adjacent areas. As a result stocks are shrinking more than is comfortable.

Tin Plate . . .

Tin Plate Prices, Page 111

Tin plate production in second quarter, according to trade forecasts, will exceed 690,000 net tons. Of this approximately 550,000 net tons will go into food containers for domestic account and approximately 55,000 tons into non-food containers, or a domestic total of about 605,000 tons. In addition, more than 60,000 tons are scheduled for lend-lease and about 23,000 to 24,000 tons for the Board of Economic Warfare.

This will represent a sharp increase over production of recent months. In the fourth quarter last year production averaged the lowest for that period in recent years, with production in December virtually nothing. The current quarter has not averaged more than 65 per cent of capacity, it is pointed out, and consequently the past six months as a whole have been well below normal, thus throwing a heavier burden on the next 3-month period. Normally second quarter is regarded as the most active period of the year, but considering the amount of tin plate permitted to be produced this year, the output next quarter it is pointed out, will be relatively higher than the second quarter ordinarily is in relation to the other periods.

On the basis, conservatively, of 22 base boxes to the ton, second quarter production as now forecast would be at the rate of more than 60,000,000 base boxes a year, which it is said, would be in excess of what is normally considered a good year's output.

Cold-Finished Steel . . .

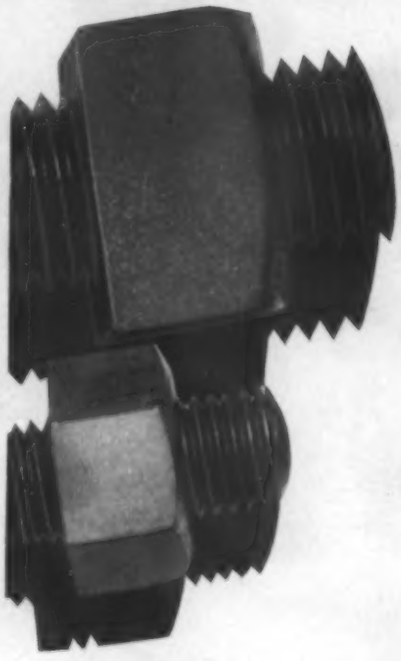
Cold Finished Prices, Page 111

Producers of cold-drawn steel have been forced to turn down considerable tonnage, as hot-rolled bar tonnage has not been increased materially except in some cases where extra bessemer steel has been allocated, largely for warehouse account. An increasing number of CMP orders is reported but even these can not be handled much before the latter part of May or early June, on carbon grades, while alloy bars run to late June or July.

Carbon bar rollings for cold drawers have been scheduled for April, with cold drawers now lining up specifications for submission not later than March 25 to hot mills for May production. This means that cold-drawn tonnage at highest preference will not be shipped against current orders for at least nine to ten weeks and probably longer in some instances.

In alloy bars schedules are at least a month longer, orders being submitted by March 25 to hot mills involve roll-

OLIVER NUTS



OLIVER NUTS

Oliver's special forming process used in the manufacture of nuts improves the appearance of the product, assures easy threading-on, a tight grip, accurate wrench-fit. Made from various steels, alloys or non-ferrous metals — heat-treated, galvanized or plated.

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STEEL FASTENERS

ings no earlier than June and some alloy bar makers have little capacity open for that period.

Some eastern cold-drawn bar manufacturers report increasing demand, some coming from points as far west as Chicago. They ascribe this to heavy consumption in the Chicago and Detroit districts where ordnance production is on the increase. Larger demand is noted from airplane engine and bearing manufacturers. The latter are taking large quantities of carbon bar stock and fairly large lots of alloy bars. Cold-finished alloy bars are being used in manufacture of 20-MM shells. Machine tool builders show little decrease in specifications.

Fluorspar . . .

Fluorspar Prices, Page 112

In spite of labor and other difficulties, production and shipments of fluorspar in 1942 were 8 and 12 per cent greater than the prior records in 1941, according to the Bureau of Mines. Production was 337,000 net tons in 1942, compared with 313,000 tons in 1941. The Illinois-Kentucky district supplied 79 per cent, compared with 86 per cent in 1941. Mine shipments were 360,316 tons, against 320,669 tons in 1941. Illinois mines shipped 161,949 tons, 3.4 per cent over the previous high of 156,676 tons in 1917. Kentucky mines shipped 6 per cent less than in 1941.

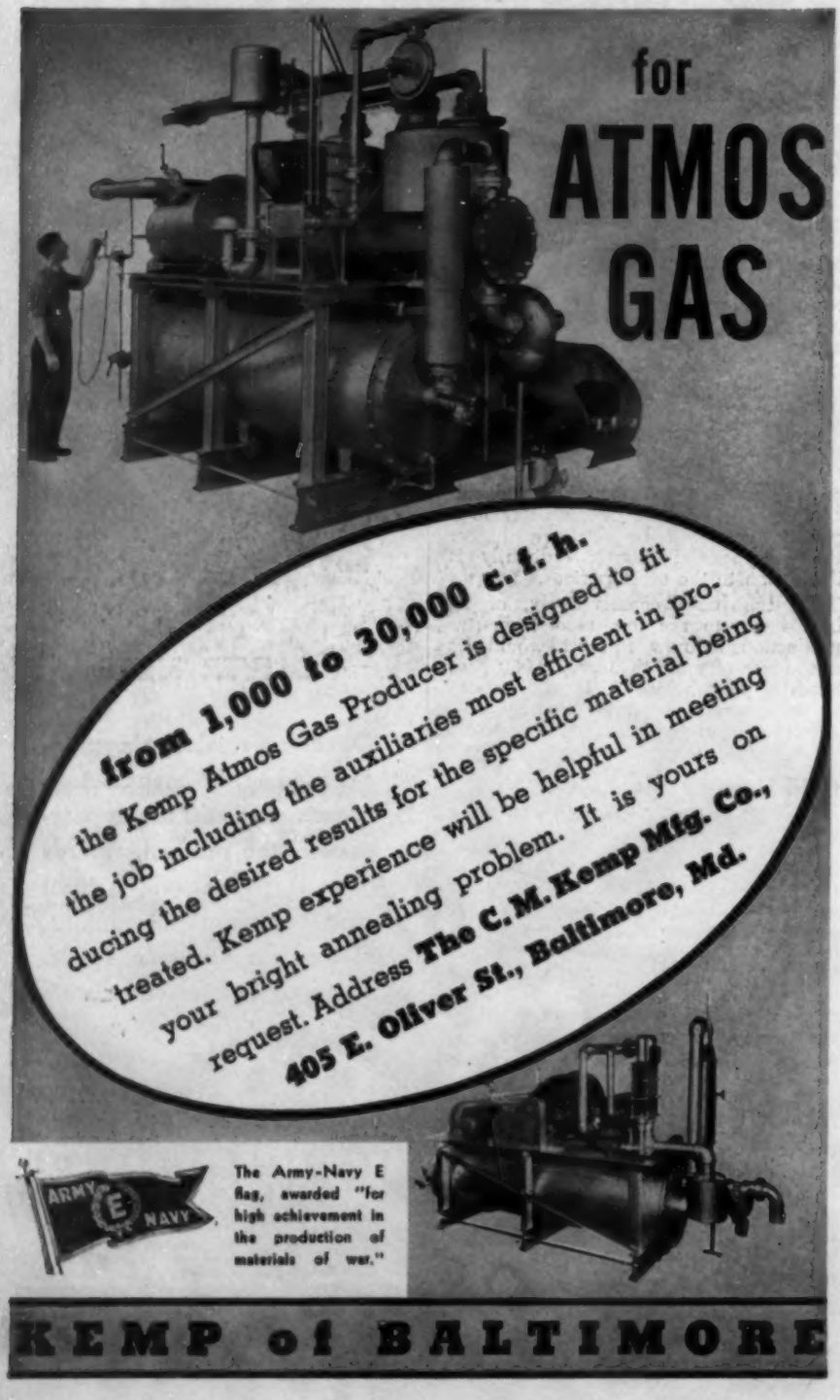
Steel mills were the principal consumer but much larger quantities were used in production of hydrofluoric acid, essential in manufacture of artificial cryolite and aluminum fluoride, aluminum raw materials. The glass industry ranks third as a fluorspar consumer but used less than in 1941. The enamel industry, formerly fourth, dropped to sixth place in 1942.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 111

Bolt and nut manufacturers, especially in the East, are in receipt of heavy specifications, notably in larger sizes, from ¾ by 12 inches and larger. Orders are said to be particularly heavy for ship work, dry docks and pier construction, in this country and overseas. The Navy is pressing hard for tonnage for repairs and to replenish stock. Where manufacturers find themselves unable to bid the Navy frequently desires to know the reason. The Ordnance Department is inquiring actively for turnbuckle eyebolts up to 1½ inches in diameter.

As a result of better demand and somewhat improved situation in steel supply, most producers are operating at the highest level in months. Some plants would be working additional shifts were more men available.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The Army-Navy E flag, awarded "for high achievement in the production of materials of war."
KEMP of BALTIMORE

Tank Builders Seek More Plates for Water Supply

Leading tank fabricators are steadily building up backlogs of war work foreign to their usual line of production. The latter has been hard hit by governmental limitations in most cases. Some large fabricating units now are booked at practically 100 per cent of capacity on small boats, sectional dry docks and other maritime assemblies. Others are not in as good position and would like to have restrictions on civilian work relaxed. They estimate that even a small tonnage of plates would enable them to meet considerable pressing demand for waterworks improvements in various localities.

For tower tanks about twice as much structurals as plates would be needed but they believe these would be easy to obtain under present circumstances. Some tank fabricators expect an easing in plate supply within the next few weeks, as shipyards are well supplied.

Communities in need of additional water facilities have been considering wood and reinforced concrete but find costs two to three times as much as for steel and in the case of the latter there is difficulty in obtaining steel bars. There has been considerable activity in purchase and re-erection of used water towers from abandoned plants, some as large as 100,000-gallon capacity.

Orders for storage tanks and containers for synthetic rubber and high-test gasoline plants are being completed, though there may be a further wave of buying for these purposes. Little tank work is being fabricated for military bases and cantonments.

Steel in Europe . . .

London—(*By Radio*)—Steel output is being steadily maintained at a high rate by steel mills in Great Britain, with

heavy bookings in practically all products. Black sheet demand is strong. Increasing interest is being shown in colliery arches, bars, structural sections and rails. Mills are unable to satisfy demand for plates, shipbuilding and war needs being large.

Canada . . .

Toronto, Ont.—With Canadian war industry now at virtual capacity, demand for steel of all classifications is the highest in history and second quarter war commitments register a new peak. Many consumers have doubled and in some instances trebled quarterly steel purchases, compared with requirements of a year ago. This high rate of consumption by war industries has placed a heavier load on primary steel needs. Canadian steel mills, however, will not reach maximum production until around the middle of the year, when plant additions now under construction are completed.

As the result of the strike at Algoma Steel Corp. Ltd., and Dominion Steel & Coal Corp. Ltd., which closed down these steel mills for two weeks in January, Canada lost about 65,000 tons of steel ingots and 50,000 tons of pig iron, while a further substantial tonnage was lost in February, while mills were endeavoring to get back to capacity production. In January production of steel ingots and castings totaled 207,800 net tons compared with 269,834 tons in December and 257,069 tons in January, 1942. In the month under review, output included 191,644 tons of steel ingots and 15,364 tons of castings. Production of pig iron in January amounted to 116,327 net tons against 164,382 tons in December and 163,156 tons in January, 1942. The month's output included 97,100 tons of basic iron, all for further use of producers; 8977 tons of foundry iron and 10,256 tons of malleable iron, all for sale.

Inquiries for sheets have developed more action recently and in addition to orders from war industries, some releases have been made recently to producers of stoves, milk cans, and similar articles. Deliveries against civilian essential orders are from two to three months. Steady buying is reported by warehouse operators.

Merchant pig iron sales held at about the average of the previous couple of weeks, totaling approximately 8000 tons. Demand is chiefly from foundries that are out of scrap or have only small stocks of scrap or iron on hand. The sharp drop in pig iron production in January and part of February, resulted in heavy withdrawals from producers stocks and blast furnace operators now are said to be down to less that 20,000 tons in stock. Pig iron production is holding at 100 per cent with all 12 stacks blowing.

Improvement in weather conditions has brought a more normal movement of scrap. Local dealers are receiving good tonnages of scrap from local plants, but nothing is coming in from rural districts.

Equipment . . .

Boston—By being in a new urgency list of classification, delivery schedules on many machine tools are revised, up to 5000 units affected. Most of these tools are listed for prompt shipment to the aircraft and allied industry and machines originally listed for delivery to

The current production of this organization is geared, first, to supply needs of the armed forces and of manufacturers producing for them.

However, that very definite policy erects no bars to thoughts of after the war production. Keep that in mind when you plan against the time when peace will come.

Today for war, tomorrow for peace, wire is the business of PAGE—and always has been.

Welding Wire: For Stainless Steel in a range of analyses that makes certain the deposit will equal the Stainless you weld. Also electrodes for all other steels. Handled by local PAGE Distributors.

Shaped Wire: Diameters to ⅜". End section areas to .250 sq. inch. Oval, half-round, square, rectangular, keystone, triangle, octagon, hexagon, channel, flat, round.

Stainless Wire: As above.

General Wire: Spring Wire, Bond Wire, Telephone Wire, etc.

Again, remember, for Victory Production or Peacetime plans:

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Nonferrous Metal Prices

Mar.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-18	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, l.c.l.	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper

No. 1 heavy	9.25-10.00
Light	7.25- 8.00

Brass

No. 1 composition	8.50- 9.00
Yellow brass castings	5.50- 6.00
Auto radiators	6.12½-6.62½
Red brass, borings & turnings	8.00- 8.50

Zinc

Old	4.75- 5.00
New clippings	6.00- 6.50

Aluminum

Clippings	9.75-10.25
Cast	8.75- 9.25
Pistons	8.50- 8.75
Sheet	8.75- 9.25

Lead

Heavy	4.75- 5.25
Mixed babbitt	5.35- 5.50
Electrotype shells	5.00- 5.50
Stereotype, Linotype	6.00- 6.75

Tin and Alloys

Block tin pipe	44.00-46.00
No. 1 pewter	32.00-36.00
Solder joints	7.75- 8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	12.50
Standard No. 12 aluminum	14.50

MAGNESIUM
(12 pound rod, 4 in. diam.)

99.8% ingot, carlots	22.50
100 lb. to carlots	24.50
Extruded sticks, ¼ to 2 lb.	
Carlots	32.00
100 lb. to carlots	34.00

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★ It's precision plus for all Horsburgh & Scott Worms and Worm Gears . . . glass-hard thread surfaces of the worms are ground all over on our exclusive precision grinders to an unexcelled accuracy of less than .001" on both indexing and lead . . . gears are generated by a cutter that is an exact duplicate of the mating worm . . . and then precision inspection. H & S worms and worm gears are the finest obtainable.

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other users are included. Shipments of machine tools are heavy, well in excess of new orders for most types, although backlogs range up to six months with many builders. For some classes of tools, deliveries gradually improve.

Total time required for complete assembly of many machines is being lowered, in part due to increased efficiency on the part of subcontractors. Earlier in the program, subcontractors engaged in new operations and details, sometimes were slow to get into peak production, but with experience, many production difficulties have been overcome and subcontractors are now doing a commendable task.

Buying includes more single units from private contractors with war work, equipment which had been held in abeyance because of uncertain and extended deliveries. Substantial part of Defense Plant Corp. contracts are now for machinery and equipment. A new industrial unit to be tooled in New England includes an aircraft propeller parts plant at Pawtucket, R. I.

Nonferrous Metals . . .

New York—War Production Board has tightened control over segregation of aluminum plant scrap. Order M-1-d, as amended March 16, requires all persons generating 500 pounds or more of plant scrap in any one month to separate it by form and alloy content.

In order to speed the flow of scrap back into war production, the amended order permits shipment of segregated plant scrap to approved smelters or dealers provided the amount of any one alloy shipped in any one month does not exceed 10 tons. Previously, the order required that shipments of any one alloy amounting to more than 2½ tons in any month be sent to producers and not to smelters or dealers.

The amended order also expressly makes dealers responsible for carrying out the segregation program; empowers the directors of the Aluminum and Magnesium Division to issue directives requiring the delivery of certain alloys to specific persons; transfers to the director the responsibility for authorizing toll agreements.

Coal-Labor

(*Continued from Page* 32)

in the steel industry as large stocks had been accumulated in advance and served to tide over the idle interval. Toward the close of the period 10 to 15 blast furnaces were banked as a precautionary measure but soon resumed. As this was a period of declining demand for steel the interruption was not serious. Mining was resumed about the middle of May, when agreements for closed shop were signed.

In March, 1935, United Mine Workers threatened a strike for a 30-hour week and a 15 per cent increase in wages but the strike was not called. President Roosevelt asked postponement to July 1, which was acceded to and in the interval a settlement was reached. Meanwhile coal consumers were in excellent position with unusually large stocks, sufficient to last several weeks, some observers stating they would furnish supply through August.

Split-Shift Plan Poses New Unionization Problem

An issue which became apparent when a few war plants, sadly pressed for labor, adopted the half-shift plan of employing white-collar workers for four hours each day blossomed in the Cleveland regional War Manpower Commission last week. The issue: Shall white-collar workers employed on a half-shift basis to forward the war effort be forced to join and pay dues to a union?

The issue was brought to light in an advice-seeking letter from a closed shop employer to the WMC's labor-management committee. The committee held the problem was not within its jurisdiction, referring it to the regional WLB.

Coincidentally, it was disclosed that about 95 per cent of the half-shift workers at Warner & Swasey Co., one of the pioneer companies in adopting the split-shift plan, had joined the AFL Machinists Union.

Murray Announces Six Regional Labor-Management Conferences

Six additional labor-management conferences have been announced by Philip Murray, president, United Steelworkers of America. These conferences, which will be held in six regions of the country and will be completed on April 25, are designed to get more steel for the war effort and will be attended jointly by representatives of industry and of the union.

The regional conferences will precede a national conference, which has been tentatively scheduled for Pittsburgh, May 2. At the national conference, top flight officials of the War Production Board, presidents of steel corporations and union officials, will attend.

According to Mr. Murray, primary purpose of both the regional conferences and the national conference will be to get maximum production of steel for the war. The conferences will include such subjects as manpower and absenteeism, and mill efficiency.

Regional meetings have been scheduled as follows: Philadelphia, March 21, including mills in New England, Eastern New York, New Jersey, eastern Pennsylvania as far as Harrisburg and Maryland; Buffalo, March 28, Central and Western New York; Cleveland, April 4, West Virginia and Ohio; Chicago, April 11, Illinois, Michigan, Indiana and Wisconsin; St. Louis, April 18, Missouri and Kansas; Birmingham, April 25, Alabama, Tennessee and Georgia.

Cooper-Bessemer Corp., Mt. Vernon, O., has started production of stationary diesel engines to be shipped to Russia under lend-lease agreement. All instructions will be printed in Russian characters and will be equipped with parts necessary for changeover from diesel fuel oil to gas or vice versa.

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INLAND 4-WAY FLOOR PLATE
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NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Minneapolis office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:

S. O. 341: Suspension lug. Large quantities. Priority AA-1. Tolerance, .008. Requires milling machines.

S. O. 356: Machining of steel forgings. Requires miller and drill with Morse taper. Job is in planning stage.

S. O. 361: Recoil cylinder. Requires boring, honing, milling, welding. Tolerance, .001.

S. O. 368: Machining. Four months' work for eight engine lathes, 18 to 22-inch. Material supplied by contractor.

S. O. 366: Anchor chain. Links 8 inches long, weight 18 pounds, in 30-fathom lengths. Operations, forging and welding. Large quantities for duration. Priority AA-1.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:

Buescher-10-1: A Pennsylvania manufacturer requires additional facilities for production of chain fittings, various sizes, from ¾-inch to 2¾ inches. Material will be furnished by prime contractor for at least a portion of the requirements. Dies to be supplied by subcontractor. However, die blocks will be available for die sinker. Equipment required, 1000 to 8000-pound drop forge hammers. Prints, specifications and samples at Philadelphia office.

Buescher-10-2: A government agency requires facilities for overhauling pancake-type diesel engines, 16 cylinders. Engines are similar to airplane engines and require well equipped shop to handle job successfully. It is anticipated that approximately six engines per week will require overhauling. Recommended facilities must be able to pass naval inspection.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-79: Single-spindle screw machine work for machines having ¼-inch diameter bar capacity. Tolerance, .004. Material, cold-rolled steel FXS318, supplied by prime contractor. Tools available for B & S No. 00, No. 0 and No. 2 machines. Continuous production required for several machines. Reference, I-J-138.

SC-80: Single or multiple-spindle automatic screw machine work for machines having 11/16-inch diameter bar capacity. Tolerance, plus or minus .002. Material, steel 1340, supplied by prime contractor. Total quantity, 800,000. Deliveries weekly to limit of machines. Rating, AA-1. Reference, 1-A-634.

SC-81: Toolmaking facilities for supplying thread gages on production basis. Sizes 5/16 to 1⅝-inch diameter in large quantities, over 1⅝ to 2½-inch diameters in smaller quantities. Continuous work. High rating. Reference, 1-A-586.

SC-82: Miscellaneous heavy shop equipment for fabricating pumping units. Principal machines required, vertical boring mill 120-inch table diameter or larger, horizontal boring mill nine feet between head and tail stocks, engine lathe 12-inch swing or over 33 feet centers, worm gear hobbing machine 76-inch diameter capacity, planers, shapers, radial drills, grinders and welding facilities. Largest individual casting 2500 pounds. Quantity, minimum 20, maximum 40. Priority AA-5 or better. Reference, 1-A-631.

SC-83: Winding machines for rewinding .040-inch wire to 5 x 5-inch spools from larger rolls. Large quantity. Priority, AA-1. Reference, 1-A-703.

SC-84: Single-spindle automatic screw machine work for machines having ⅛-inch diameter bar capacity. Tolerance, .004. Material, cold-rolled steel FXS318 supplied by prime contractor. Tools available for B & S No. 00 and No. 0 machines. Continuous production required for several machines. Reference, 1-J-138.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson Boulevard, is seeking contractors for the following:

Bell & Howell Co., 7100 McCormick boulevard, Lincolnwood, Ill., attention Clinton S. Davis. Priority AA-1. Parts, retainer tube, cells and eyepiece cell. Subcontractors within 100 miles of Chicago preferred. Material, brass. Quantity, 12,000 of three items, 28,000 of fourth. Equipment, 1¼ and 2-inch capacity single-spindle automatic screw machines. 1½ and 1¾-inch bar capacity turret lathes. Tolerance, .001.

Elastic Stop Nut Corp., 2330 Vauxhall Road, Union, N. J., attention E. G. Wibom. Priority AA-1. Part, nut blanks, three sizes. Job can be divided among several subcontractors. Material, steel, B-1112, C-1118, C-1137, furnished by contractor. Equipment, single or multiple-spindle automatic screw machines. Will consider subcontractors anywhere. Production requirements 20 million per week.

Galvin Mfg. Co., 4301 West Madison street, Chicago, attention Harold Vonder or Clarence Jensen. Priority AA-1. Generator extension tube. Quantity, 5000 from time to time. Subcontractor in Chicago area preferred. Contractor will supply material, which is copper. Equipment, 1-inch bar capacity turret lathe, 2-spindle bench drill, 5/16-inch drilling capacity. Tolerance, .002.

Lion Mfg. Co., 2640 Belmont avenue, Chicago, attention W. C. Billheimer. Priority AA-1. Machine parts. Production 7500 per month, starting April 1. Contractor will furnish No. 416 free-machining stainless steel ground to size and all gages. Quantity, 500,000 each of two items. Equipment, ⅜-inch capacity single-spindle automatic screw machines. Tolerance, .002.

Henry Paulson & Co., 37 South Wabash avenue, Chicago, attention Henry Paulson. Parts are generally similar to male and female parts of a micrometer and are to be knurled and graduated only, in accordance with the metric system. Are for tailstock of precision lathes. Quantity, 200. Equipment, pantograph 9 x 12 inches T, bench lathe 7 x 16 x ¾-inch collet, No. 215 dial graduating machine.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

300 tons, bin gates, blast furnaces 1, 2 and 3, Columbia Steel Co., Geneva, Utah, to Worden-Allen Co., Milwaukee.

SHAPE CONTRACTS PENDING

175 tons, I-beam bridge, Eddystone borough, Delaware county, Pennsylvania; bids to state highway department, Harrisburg, Pa., March 26.

REINFORCING BARS . . .

REINFORCING STEEL PENDING

375 tons, I-beam bridge, Eddystone borough, Delaware county, Pennsylvania; bids to state highway department, Harrisburg, Pa., March 26.

BUSES BOOKED . . .

Twin Coach Co., Kent, O.: Thirteen 43-passenger for Seattle Transit System, Seattle; six 41-passenger for United Electric Railways, Providence, R. I.; four 43-passenger for Cincinnati Street Railway Co., Cincinnati; one 44-passenger for Georgia Power Co., Atlanta, Ga.

CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Cleveland Machine & Mfg. Co. is being incorporated to operate a machine and repair shop, by Owen P. Gallagher, R. I. Anderson and H. H. Edwards. Agent is W. M. Byrnes, 308 Euclid avenue, attorney.

CLEVELAND—Basic Refractories Inc., Howard P. Eells, president, Hanna building, plans to lease and operate a dolomite refractories plant built by Defense Plant Corp. adjacent to its works at Narlo, O.

CLEVELAND—Marsh Products Inc. has applied for charter to incorporate. Organized by Rudolph Perlmuter, Harry Lavin and Sanford Schwartz, 1016 Standard building, agent, the firm will manufacture war products for machine shops.

CLEVELAND—Standard Alloy Co., 1679 Collamer road, has let contract for addition to factory.

CLEVELAND—Triangle Tool, Die & Stamp Co., 4822 Payne avenue, is awaiting action of board of zoning appeals before purchasing factory at 5101 Carnegie avenue. Factory alterations are planned after conclusion of purchase.

CLEVELAND—Ohio Electric Mfg. Co., F. W. Jessop, president, is starting $26,000 addition to motor and lifting magnet factory at 5901 Bellford avenue.

MICHIGAN

DETROIT—Quality Tool & Machine Co., 9101 Grace avenue, has been organized with $55,000 capital to operate tool and machine

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Carbon Determinator provides accurate and rapid carbon determination of ferrous and non-ferrous materials, well within A.S.T.M. specifications for control work . . . and within two minutes.

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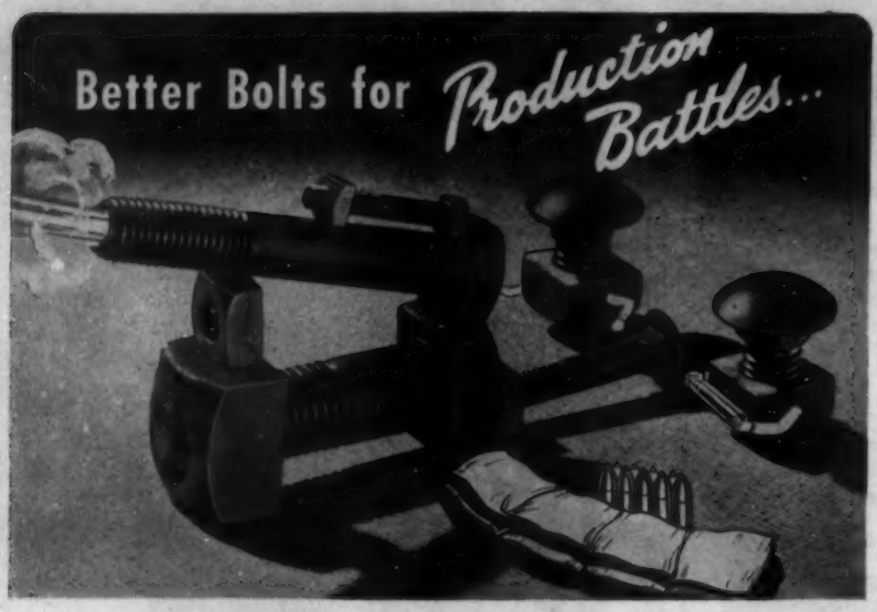

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shop. Agent, Angelo Imbrunone, 1566 St. Clair drive, Mt. Clemens, Mich.

DETROIT—Design Tool Mfg. Co., 12324 Livernois avenue, has been incorporated to deal in tools, dies, etc. Curtis S. Williams, 12152 Monica avenue, agent.

DETROIT—Bids have been taken for addition to factory at 1301 East McNichols street for Universal Gear Works.

ROYAL OAK, MICH.—Agdan Machine Corp., 1921 Kenneth avenue, Royal Oak, has been formed to deal in tools, dies, machinery, etc. Leonard B. Arloff, 13942 Asbury Park, Detroit, agent.

NEW JERSEY

BELLEVILLE, N. J.—Wallace & Tiernan Co., 11 Mill street, has let contract for one-story boiler house extension to Mahony-Troast Corp., 657 Main avenue, Passaic, N. J. Cost $40,000.

JERSEY CITY, N. J.—Western Electric Co., 100 Central avenue, Kearny, has let contract for repairing, and altering manufacturing plant to Hugh Montague & Sons, 880 Bergen avenue, Jersey City. Cost $40,000.

NEWARK, N. J.—A. Hollander & Sons, 143 East Kinney street, has let contract for foundations to Underpinning & Foundations Co., 155 East Forty-fourth street, New York. Abbott Merkt & Co., 100 East Fortieth street, New York, engineer.

PERTH AMBOY, N. J.—Kincaid Mfg. Co., 17 East Forty-second street, New York, has let contract for one-story addition to Walter Kidde Construction Co., 140 Cedar street, New York. Cost estimated at $75,000.

PENNSYLVANIA

ERIE, PA.—Perry Furnace Co. is increasing output of its metalworking plant by adding to factory building.

MASSACHUSETTS

CAMBRIDGE, MASS.—C & W Tool Co., 19 Chestnut street, has let contract for altering factory at 89 Broadway to George Pigott, 11 George street, Hyde Park. E. Putnam, 107 Massachusetts avenue, Boston, architect.

DORCHESTER, MASS.—George Lawley & Sons Corp., 76 Ericsson street, will build one-story factory on Walnut street. J. Worcester & Co., 79 Milk street, Boston, engineer.

DORCHESTER, MASS.—Meisel Press Mfg. Co., Dorchester avenue, has let contract for extensive alterations to plant to McCreery & Theriault, 131 Clarendon street, Boston. Estimated cost $70,000.

MALDEN, MASS.—Lawson Machine & Tool Co., 131 Exchange street, has let contract for converting three-story building into machine shop to J. Gascoigne & Co. Inc., 8 Beacon street, Boston. Estimated cost over $40,000, including equipment. W. J. Freethy, 69 Pontiac road, Newton, architect.

MARYLAND

BALTIMORE—Eastern Aircraft Division, General Motors Corp., is further expanding its facilities at 2122 Broening Highway in a plant formerly occupied by Fisher Body Division of General Motors. Program includes re-equipping of approximately one-third of the adjoining plant of Chevrolet Motor Co., utilization of a large building for storage and provision of new office space.

CONNECTICUT

PUTNAM, CONN.—Empire Finished Steel Corp., 63 Canal street, has awarded contract for factory addition, including crane runway. L. F. Caproni, 1221 Chapel street, New Haven, Conn., engineer. Estimated cost $40,000.

CALIFORNIA

ALAMEDA, CALIF.—General Engineering & Drydock Co., foot of Schiller street, plans two-story powerhouse and compressor building.

BERKELEY, CALIF.—Regents University of

"HERCULES" (Red-Strand) Preformed Wire Rope can help you keep production in high gear. Its easy handling, smooth spooling, and long life insure maximum hours of work for each pound of steel used. It saves while it serves. Available in both Round Strand and Flattened Strand Constructions.

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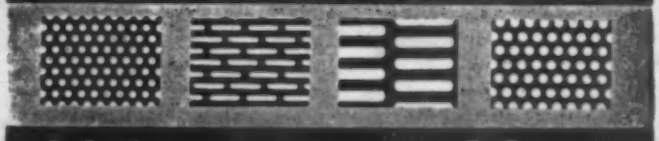

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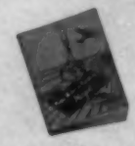

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IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

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California, Berkeley, has awarded contract for laboratory building, storehouse, sheet metal shop, for Cyclotron project to J. E. Branagh, 105 Sheridan street, Piedmont, Calif. Estimated cost $70,000.

CULVER CITY, CALIF.—Contract has been let for assembly building near here for Kaiser-Hughes Co. Estimated cost $1,500,000.

MONROVIA, CALIF.—Contract has been awarded for 20 factory buildings to be erected on 40-acre site in Los Angeles county for Aerojet Engineering Co., an affiliate of Day & Night Mfg. Co., Monrovia. J. O. Oltmans & Sons, 810 East Eighteenth street, Los Angeles, contractor.

WOODLAND, CALIF.—Weaver Tractor Co., Nineteenth and T streets, Sacramento, Calif., has plans by H. J. Devine, Cronan building, Sacramento, for machinery repair building. Estimated cost $50,000.

TEXAS

TAYLOR, TEX.—Defense Plant Corp. has authorized plant facilities in Texas by Taylor Refining Co., Taylor, to cost $1,000,000.

TROUP, TEX.—General Refractories Co., Real Estate Trust building, Philadelphia, has asked bids for 100 x 680-foot main building, main kiln 500 feet long and several smaller kilns. Estimated cost $250,000.

TENNESSEE

MEMPHIS, TENN.—Memphis Light, Gas & Water division, care of Col. Thomas H. Allen, chief engineer, plans electric substation costing between $40,000 and $50,000.

WISCONSIN

KENOSHA, WIS.—Dynamatic Corp., 3307 Fourteenth avenue, plans one-story storage building.

MISSOURI

ST. LOUIS—Defense Plant Corp. has authorized contract with St. Louis Smelting & Refining Co., 722 Chestnut street, St. Louis, for an estimated $580,000 expansion of its facilities.

GEORGIA

ATLANTA, GA.—Southern Railway System, Washington, will erect diesel engine building here costing $63,000.

MINNESOTA

ST. PAUL—Erickson Machine Shop, 72 West Fillmore avenue, Walter Erickson, proprietor, will build one-story factory.

CANADA

TADANAC, B. C.—Consolidated Mining & Smelting Co. of Canada Ltd., Trail, B. C., will start work soon on plant addition and installation of equipment to cost about $135,000.

VANCOUVER, B. C.—Tyee Machinery Co. Ltd., Granville Island, has plans and will let contracts soon for plant addition to cost about $55,000, with equipment.

ETOBICOKE, ONT.—Plibrico Jointless Firebrick Ltd., 868 Lake Shore road, New Toronto, has plans for further plant addition to cost about $40,000, with equipment.

ETOBICOKE, ONT.—Aluminum Co. of Canada Ltd., Sun Life building, Montreal, has given general contract to A. W. Robertson Ltd., 37 Bloor street West, Toronto, and preliminary work has been started on plant to cost $500,000, with equipment.

GALT, ONT.—Galt Art Metal Co. Ltd., 386 Dundas street, has given general contract to G. H. Thomas & Son Ltd., 45 Dickson street, for plant to cost $15,000. Ray M. Hall, architect, 9 Cathy street.

GRAVENHURST, ONT.—Rubberset Co. Ltd., Second street, plans to start work soon on plant addition and installation of equipment to cost about $25,000.

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Army-Navy Spec. AN-QQ-S-763

SHEETS

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COLD ROLLED, NORMALIZED
Army-Navy Spec. AN-QQ-S-685

18-8
STAINLESS COLD ROLLED
Army-Navy Spec. AN-QQ-S-772

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SEAMLESS COLD DRAWN
Army-Navy Spec. AN-WW-T-850

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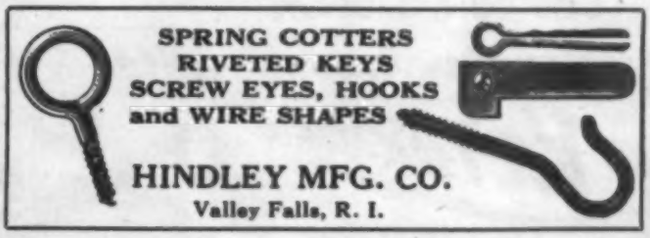

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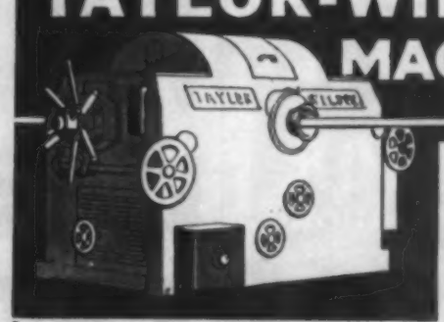

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Ltd., 60 Front street, Toronto, is having plans prepared for plant addition here and installation of equipment to cost $55,000. Dominion Rubber Co. Ltd., 550 Papineau avenue, Montreal, is lessee of plant.

HAMILTON, ONT.—Steel Co. of Canada Ltd., Wilcox street, has given general contract to Tope Construction Co. Ltd., 677 Main street West, for two plant additions to cost $40,000. Hutton & Souter, Pigott building, architects.

KINGSTON, ONT.—Bishop Engineering Co. Ltd., 378 King street East, D. L. Jackson, manager, is having plans prepared by Colin Drever, architect, 811 Brock street, for plant addition and installation of equipment, to cost about $20,000.

LEASIDE, ONT.—Howard Furnace Co., 881 Yonge street, Toronto, has plans and will let contracts soon on plant here to cost about $50,000, with equipment.

OSHAWA, ONT.—Duplate (Canada) Ltd., First avenue, has plans for plant addition to cost about $40,000, including equipment.

ST. CATHARINES, ONT.—Foster Wheeler Ltd., 159 Bay street, Toronto, has given general contract to H. A. Wickett Co. Ltd., 156 Front street East, Toronto, for plant addition to cost about $20,000.

TORONTO, ONT.—Silverware Products (Canada) Ltd., 98 Munro street, has plans by Benjamin Brown, 21 Dundas square, for plant building at 108 River street, to cost about $12,000.

TORONTO, ONT.—H. Diston & Sons Ltd., 2 Fraser avenue, has given general contract to R. G. Kirby & Sons Ltd., 539 Yonge street, for plant addition and install equipment to cost $48,000. Earle L. Sheppard, 57 Queen street West, architect.

TORONTO, ONT.—Consumers Gas Co. Ltd., 19 Toronto street, will start work soon on repairs to plant at Front and Berkeley streets, at cost of approximately $103,000.

TORONTO, ONT.—A. L. Torgis & Son, 188 Gladstone avenue, has called bids and will let contracts soon for machine shop addition estimated to cost $15,000, with equipment.

TORONTO, ONT.—Canada Metal Co. Ltd., 721 Eastern avenue, has given general contract to Wells & Gray Ltd., 701 Confederation Life building, and work will start immediately on plant addition to cost about $15,000.

TORONTO, ONT.—Foundation Co. of Ontario Ltd., 1158 Bay street, will erect yard machine addition and install new equipment to cost about $10,000.

CALUMET ISLAND, QUE.—New Calumet Mines Ltd. plans erection of plant buildings and installation of equipment to cost about $350,000.

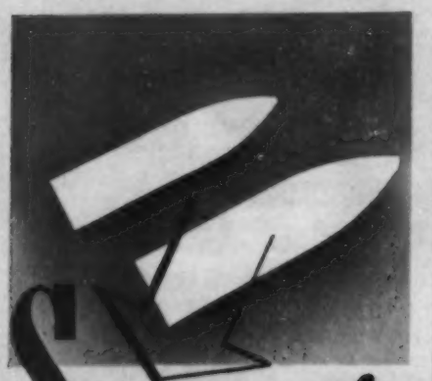
MONTREAL, QUE.—Dominion Bridge Co. Ltd., First avenue, Lachine, has given general contract to Richard & B. A. Ryan Ltd., 1808 William street, for repair shop to cost about $7000, equipment extra.

VILLE ST. LAURENT, QUE.—Continental Can Co. of Canada Ltd., 2600 Mullins street, Montreal, will build plant addition here to cost $500,000, with equipment.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., Sandwich street, East, has called bids for foundry addition and other plant addition to cost about $200,000.

WINDSOR, ONT.—Dominion Forge & Stamping Co. Ltd., 284 Seminole road, has plans for plant addition to cost $6000, equipment extra.

DARTMOUTH, N. S.—Department of Public Works, Hunter building, Ottawa, J. M. Somerville, secretary, has given contract to Hamilton Bridge Co. Ltd., Bay street North, Hamilton, for fabrication and erection of one 10-50 ton electrically operated, stationary hammerhead crane complete for the naval ordnance wharf here.



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1 Niles	30 ton	50′0″ DC
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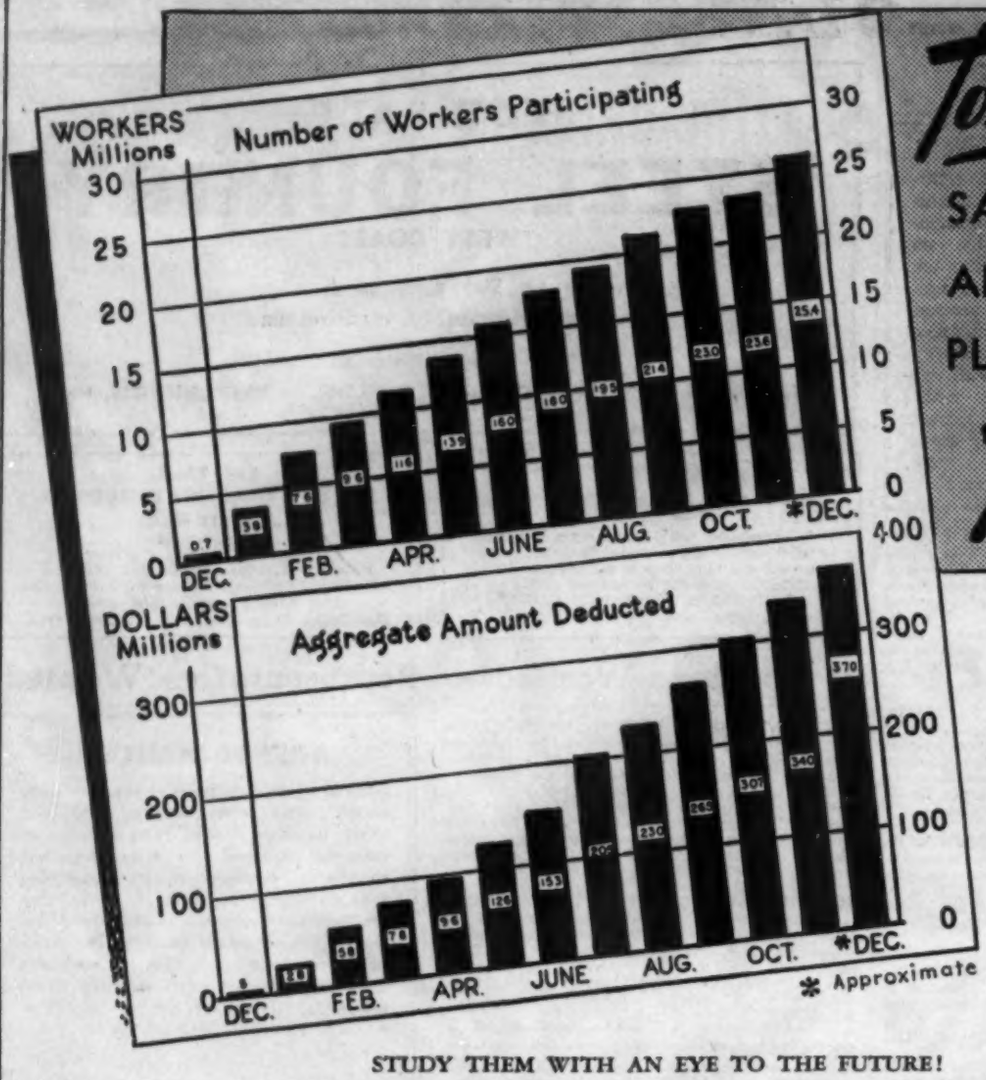

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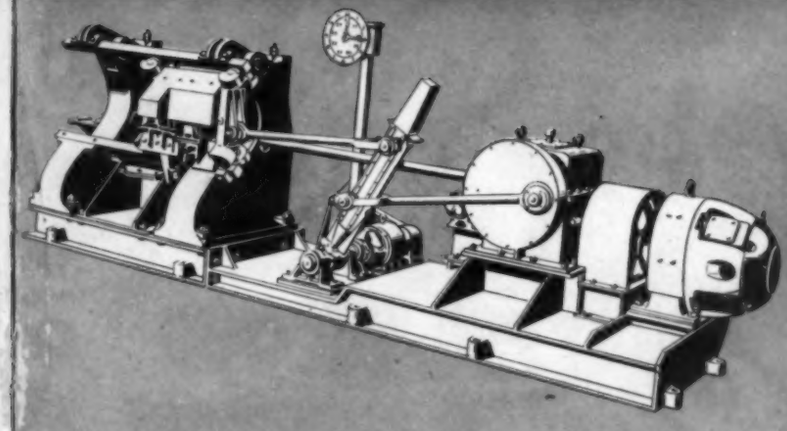

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